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No. 1.16 E

AGRICULTURAL PRICE AND INCOME POLICY  
IN THE EC:  
ALTERNATIVE POLICIES AND THEIR  
IMPLICATIONS

August 1980



SIGN: L26-1.16E  
EX. NO: 8  
MLV:

Agricultural Economics Research Institute  
Staff Department

123309

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## Foreword

The publication in 1975 of the "Stocktaking of the Common Agricultural Policy" by the Commission of the European Communities encouraged an assessment of that policy in several Member States. In the Netherlands, the Ministry of Agriculture entrusted to the Agricultural Economics Research Institute (AERI) the task of analysing and evaluating the objectives and policy instruments of the common agricultural policy. This evaluation was to contain three parts:

1. statement of the qualitative and quantitative significance of the common agricultural policy for agriculture, and for the economy as a whole, in the Netherlands;
2. consideration of the objectives and policy instruments of the common agricultural policy against the background of the EC economy;
3. assessment of the external effects of the common agricultural policy.

The first part of the assessment was given in an article by Professor J. de Hoogh published - in Dutch language - in the 1975 AERI Annual Report.

A report on the second part was given in two separate publications. Both were drawn up - largely under the direction of Professor de Hoogh - in the Staff Department by Mr G. Meester. Publication 1.15 - which is only available in Dutch language - deals with the objectives, policy instruments and effects of the policy - principally market and price policy as carried out so far. The publication largely a statistical description of the developments in EC agriculture since 1962 and will be published in 1980. This publication, No. 1.16, amplifies 1.15 by comparing the present market and price policy with some other types of price and income policies.

The analysis is of a theoretical nature and is mainly concerned with setting out the economic effects of various policy instruments, in particular the influence of the common agricultural policy on EC agriculture and the EC economy as a whole. Only limited attention is paid to the differing economic effects for the separate Member States.

Because of this limitation and because of the impossibility of evaluating economic effects on the basis of objective criteria no preference is expressed in the report for any one alternative. Even after supplementary economical research it would be impossible for a research institute like the AERI to make judgements of that kind. For this purpose, a political assessment of the economic and other factors is necessary. Such an assessment would, for example, cover questions of technical and administrative feasibility and social desirability as well as the matter of relative

advantages and disadvantages for the individual Member States and whether it is desired to support agricultural incomes by the market or - in part - by subsidies from the Treasury. This study is simply intended to provide a contribution to the discussion which precedes decision-making on the future form of the agricultural policy.

The external effects of the common agricultural policy are dealt with in part in the historical description as well as in the theoretical analysis. It is intended later to publish a separate paper on this third part of the survey.

This study has been published in Dutch language in February 1979. The AERI expresses its heartfelt thanks to the Services of the EC Commission who provided for translation in English.

The Hague, August 1980

A. Maris

Director

# 1. Introduction, summary and conclusions

## 1.1 Introduction

A survey of developments in European agriculture in recent years has shown that since the introduction of the first regulations under the common agricultural policy, only part of these policy objectives have been achieved<sup>1)</sup>. Apart from the question whether this is the result of the policy or of other factors, there were in the six-member EC in the period in question a high and rising level of supply of agricultural products, a large increase in productivity in agriculture and relatively stable prices for agricultural produce and foodstuffs. Moreover the increase in prices for agricultural produce and foodstuffs was lower in most Member States of the Community as originally constituted, than the general increase in prices. It was also noted, however, that the level of agricultural prices in the EC was almost permanently higher than outside; that for some products there were frequently imbalances between supply and demand, which gave rise to formation of stocks; and that producers from non-member countries lost scope, in relative terms, for sale of agricultural produce to EC markets. The survey also showed that for the whole period the average income per head of the population employed in agriculture remained lower than the average income per head for the working population as a whole. Finally, the aimed harmonisation of prices in the Community were still not achieved and government expenditure on agricultural policy rose substantially.

### Alternative policies for study

There are numerous publications which suggest the introduction of other forms of agricultural policies, arguing that these alternative policies would be more suitable for achieving the desired objectives than the present policy.

This report compares some of the suggested alternatives with one another and with the existing policy. The intention of this is to provide some insight into the extent to which these alternatives would in fact better contribute towards achieving the policy objectives.

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<sup>1)</sup> The results of this survey will be published in 1980 in Dutch language in AERI publication no. 1.15 called: "Doeleinden, instrumenten en effecten van het huidige landbouwbeleid in de EG". ("Objectives, policy instruments and effects of the present EC agricultural policy").

This report is restricted to comparison of certain forms of price and income policy and does not cover other parts of the overall agricultural policy (structural policy; policies concerning education, research and advisory, etc.). We feel we can make this restriction since these other areas of policy, unlike price policy, are primarily the responsibility of the various Member States' governments rather than of the EC.

The report makes a distinction between two groups of alternative policies: one in which the income objective has the highest priority and one in which, beside the income objective, supply control is paramount. The first group is discussed in Chapter 2, which reviews successively the present price policy, a system of deficiency payments, a system of income subsidies per hectare or per animal employed and finally a system of direct income payments to farmers. Chapter 3 discusses the second group with which restricting us to three forms of quota arrangements, all in combination with some form of price support. We consider successively an arrangement under which the present price guarantee system is limited to an EC-wide production quota, an arrangement under which this system is applied for quotas awarded to individual farm firms, and finally an arrangement under which the price guarantee system is replaced by a system of deficiency payments for quotas awarded per farm firm.

#### Maintenance of present income levels as starting point

The starting point for comparing the alternative policies was that agricultural income levels would be the same in each case as under the present price policy. In this way the alternative policies are accordingly made entirely comparable in respect of the extent to which they achieve the main objective of the agricultural policy. In Chapter 2 equal income levels are ensured by fixing requirements in respect of the level of the price or income subsidy, and in Chapter 3 by observing what occurs when the loss of income resulting from the quota arrangements is offset by an increase in prices within the quota.

There is accordingly no difference between the alternative policies in respect of their effects on the level of incomes but there may be differences in income distribution within agriculture. This is dealt with separately.

#### The economic effects examined

The choice of other economic effects used as a basis for comparing the alternative policies with one another is partly based on the objectives stated in the Treaty establishing the European Economic Community and partly on a general condition with regard to the execution of the policy. In connection with the general objectives of the Treaty (Article 2), consideration is given to the social costs of the policy, the effects on the national income and the influence on the regional distribution of

production and income within the Community. The effects on the level of consumer prices and expenditure and the extent of production and demand (degree of self sufficiency) are examined with regard to their relationship with some of the objectives of the agricultural policy set out in Article 39 of the Treaty. The objectives given in Article 110 in respect of international trade require analysis of the effects of the policy on trade with non-member countries. Attention is finally given to the impact of the policy on the level of government expenditure, since this level is an important basic condition for executing the policy.

#### Price stability and price support

The analysis starts from the principle that the alternative policies do not differ in respect of achieving the objective of stabilizing markets expressed in Article 39 of the Treaty. It is assumed that this stabilization, which we interpret as the realisation of price stability in the short term, is achieved with all the alternatives in the same way as under the present price policy. This means that it is always assumed that, regardless of the desired market price, a policy of price stabilization is followed which, by means of variable levies and subsidies at the frontier (together, if necessary, with intervention arrangements on the internal market) insulates the level of producer and consumer prices in the EC from fluctuations on the world market or from those which result from irregularities in internal supplies.

The present price policy is accordingly broken down into two parts: a policy of price stabilization, which aims at keeping the price level and, accordingly, producers incomes and consumers' expenditure - regardless of level - as far as possible constant, and a price support policy intended to maintain the level of agricultural incomes. The report is largely concerned with the second part. The policy of price stabilization is discussed only in Chapter 4, where the external effects of the common agricultural policy are dealt with.

To emphasize that this report is primarily concerned with the support aspect of the price and income policy, the expressions price support and income support rather than the terms price policy and income policy are frequently used.

#### Improvements in productivity

Another main objective of the common agricultural policy laid down in Article 39 of the Treaty is that of increasing agricultural productivity. It is assumed in the report that in general improvements in productivity or in efficiency are not dependent on the way in which the price and income policy is pursued. This assumption seems justified since it was earlier assumed that, for each of the alternative policies to be introduced, the farmgate price (at whatever level) is stable and the level of income in



agriculture is, on average, similar. These two conditions, occurring under all alternatives, have a substantial influence on the speed at which technological innovation can be applied in agriculture and accordingly on the improvement of agricultural productivity.

The productivity assumption holds good in all cases except one, namely that in which attribution of fixed production quotas interferes with regional specialization within the EC or tends to ossify production structures.

#### World market prices

In order to assess the social costs and government expenditure involved in a policy, an assumption must be made as to the world market prices. In the first instance, it is assumed that the world market price for agricultural products as far as relevant for the EC is independent of developments in European agriculture. Any required quantity of agricultural produce can accordingly be purchased or sold by the EC without influencing the world price level. In this connection it is further assumed that intervention policy merely serves to bridge differences in space and time between production and consumption which occur within the year on the internal market. Over the years, no intervention stocks accumulate except this is a specific aim of an active stocking policy.

At the end of this report, the consequences of discarding the assumption of independent world market prices are examined and it is found that the EC price and income support generally tends to a lower world market price, than in a situation without that support.

This finding is not only significant for assessing the social costs and government expenditure involved in the alternative policies, but also for determining the extent of income transfer between producers and consumers (and thereby taxpayers). We emphasize that, when measuring these income transfers, one must only use world market price levels adjusted to eliminate the world price-lowering effect of the EC policy. The normalized and stabilized world market prices given in Chapters 2 and 3 are assumed to comply with that requirement, whereas present-day world market prices do not in fact so comply and to refer to them results in overestimating the price and income support granted to agriculture in the EC.

#### Administrative costs

It was stated earlier in this section that the alternative policies are also compared in respect of their effects on the government's budget and consumers' expenditure. Income redistribution through the market is financed mainly by the consumers; income redistribution via subsidies charges the Treasury and hence the taxpayers.

With regard to these effects, the report merely studies in which cases which type of income redistribution takes place. With respect to the social costs of any of the alternatives, no account is taken of the administrative cost of transfer nor of differences in cost resulting from differences in the ease with which costs can be passed on, in the possibilities of fraud, etc., and in the costs of control on these matters. It is, however, broadly stated in the report in what cases difficulties in implementations arise and of what type these difficulties are. The social costs which may occur under various forms of income transfer are also discussed.

#### Regional aspects

Perhaps the most significant point in decision-making within the EC is the extent to which the individual Member States stand to gain or lose from alternative policies. Professor De Hoogh's article in the 1975 AERI Annual Report covered the significance of the present EC agricultural policy for the Netherlands. It would be beyond the scope of a study on the influence of alternative policies on the EC economy and EC agriculture as a whole to give extensive attention to the consequences for the individual Member States. The report accordingly merely points out differences in effects between the various alternatives with regard to regional distribution of production and income. Separate individual studies are required for analysis of the consequences for individual Member States.

#### No political conclusions

The above shows that the report is largely confined to analysis of the economic effects of alternative policies for the Community as a whole. Because of this limitation and because of the impossibility of evaluating on the basis of objective criteria, economic effects of alternative policies, no preference is expressed in the report for any one alternative.

Even after supplementary economic investigation it would be impossible for a research institute like the AERI to make judgments of this kind. For this purpose a political assessment of economic and other considerations is necessary. Such an assessment would rest, for example, on matters of technical and administrative feasibility and social desirability, as well as on the question of relative advantage and disadvantage for individual Member States and whether agricultural incomes should be supported through the market or, in part, through government subsidies.

The object of this study is simply to provide a contribution for discussion prior to any decision on the future arrangement of the agricultural policy.

## 1.2 Alternative forms of income policy without direct supply control

Chapter 2 considers four alternative policies intended mainly to achieve the agricultural income objective. Besides the present type of income policy through price policy, we discuss systems of deficiency payments (price subsidies per unit of output), factor-related income subsidies (of two kinds, subsidies per hectare of land and subsidies per animal) and direct income payments to farmers. For each alternative the mechanism by which the subsidy is granted and the effect it has are studied. In order to detect the effects, the situation under the alternative policy is in each case compared with the situation without any form of income support. Comparisons are also made amongst the alternative policies studied.

A summary of the alternative policies discussed and their effects is given in Annex 1 to this report. The main conclusions are presented in the following paragraphs.

### Volume of production and consumption of supported and non-supported products

The type of policy chosen within the EC results in a price increase for products subject to a market organization. The result for producers is an increase in the marginal revenue per unit of output, which makes it profitable to increase production on short term by employing more variable inputs. Besides this type of income support results in maintenance of fixed production resources in agriculture which would otherwise be reallocated. This also has, in the long term, the effect of increasing production.

The variable and fixed production resources originate partly from non-agrarian sectors or from overseas and a further proportion comes from types of agricultural production which are not subject to support. Therefore income support also influences the volume of outputs of unsupported products as well.

From the consumer's point of view an increase of farm gate prices means higher costs of consumption. This results in a fall in demand for the supported product and partial substitution of it by unsupported products. In this way too, then, price support affects supported as well as unsupported products.

General subsidies per hectare, i.e. subsidies based on the whole acreage and not on special crops, and direct income payments to farmers do not have any direct effect on the level of prices of agricultural products either on the demand or supply side. They accordingly also cause no change in marginal costs and revenues and thus no change in the volume or composition of production and consumption. But here too income support does affect the use of fixed inputs (labour and machinery and buildings) and thus, in the longer term, the volume of production. The subsidies

are therefore not neutral with respect to production. However, since there are no price distortions, there are no shifts from one product to another. The volume of productions of all agricultural products, and not only of those subject to a market organization, increases. But the output boosting effect is much less powerful than under the present system of price support.

Deficiency payments and crop-related income subsidies per hectare or per animal occupy an intermediate position. In this case, as in the case of overall subsidies, demand is unaffected: the price relationships for consumers remain unchanged compared with the situation in which no income policy is followed, but there are significant effects on the production side. Deficiency payments result in the same increase in marginal revenue of final products and accordingly in the same effects on production and substitution as the present price policy. Crop-related income subsidies per hectare or per animal make it attractive to increase the use of the subsidized inputs which give rise to an increase of the volume of production. The extent of this increase and the extent to which it takes place at the expense of unsupported products will vary. On the whole, deficiency payments lead to the largest production increase in supported products and crop-related income subsidies result in the largest switches from unsupported to supported crops.

#### Social costs

Agricultural income support involves relatively the highest social costs when the arrangement entails an increase of the internal market price for agricultural products above the world market price (as takes place in practice in the EC at present). These social costs, which should be distinguished from the much higher income transfers, consist of:

1. the cost of the extra input of resources (both within and outside agriculture) caused by the higher general level of prices in agriculture less the resultant increase in production;
2. the loss in consumer's surplus caused by the increase in the average price of foodstuffs less the extra income accruing to producers;
3. the loss of utility resulting from the socially and economically inappropriate changes in the pattern of production and consumption (and thereby also that of import and export) of agricultural products, to the extent that the price policy distorts the domestic price relationships between alternative products to a significant extent compared with international price relationships.

The cost factors called under (1) and (2) are relatively insignificant in view of the fairly low price elasticity both of the

total supply in agriculture and the total consumption of agricultural produce. Cost factor (3) may, depending on the extent to which price relationships are distorted (for example, between grain and other feeding stuffs), be more significant.

In times of unemployment the social costs are lower than in times of full employment, since the opportunity costs of the additional inputs in agriculture are lower.

Of these social costs, only factors (1) and (3) are expressed in a change in the EC's gross national product; by definition, change in the consumer's surplus has no influence 1).

This analysis ignores any costs resulting from income redistribution through the government budget (e.g. the costs of prevention of urgent public expenditure because the authorities are reluctant to impose further increases in taxation).

The social costs of deficiency payments or crop-related income subsidies per hectare or per animal are lower than those of the present price policy, particularly when these subsidies are financed through progressive taxation. Since consumer prices are unaffected, no loss of consumer's surplus takes place in this way. Furthermore, there is no distortion of the relationships between consumer prices and this avoids a switch in products consumed (e.g. in the compound feeding stuffs industry), which would be inappropriate from the point of view of social costs.

One difference between crop-related subsidies per hectare and deficiency payments is that the former on the production side as well involve less social costs than the present policy, whereas the latter do not. In the case of subsidies per hectare, there is no increase in the marginal revenue and this means lower use of variable inputs. There is, however, a greater tendency to change the use of land from unsupported to supported crops. This further change does not take place, indeed, if the subsidies are based on the lowering of the difference between gross revenue and variable costs and not only on the lowering of gross revenue as a consequence of the price reduction.

General subsidies per hectare and direct income payments to farmers are from a social point of view even less costly since in such cases shifts in the composition of production which are undesirable from the consumer's and producer's point of view, do not occur, but the encouragement to retain labour and capital in agriculture results under this system, as under all other types of income support, in extra social costs.

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1) The costs of agricultural policy are often taken to cover the effects of that policy on the EC's gross national product. These costs are called national economic costs. This paper employs the expression social costs, which means that the costs of agricultural policy include both national economic costs and the loss of consumer's surplus.

## Distribution of income within agriculture

Income transfers through product prices (by means of market regulation or deficiency payments) are irrevocably dependent on the quantity a farmer produces.

Systems of subsidies per hectare or direct income payments make it possible to support incomes by other criteria and accordingly to run a more differentiated income policy. However, the adoption of criteria (e.g. with regard to size of farm, type of farm, region and perhaps even income level) means that practical application is entirely dependent on a suitable administration. For this reason, the introduction of a system of direct income payments to farmers in particular seems to be practically impossible in the EC.

The higher prices for agricultural products entailed by the present price policy mean higher costs for stock-farmers owing to an increase in the price of feed. Initially this results in a redistribution of income from these livestock producers towards the farmings growing the feed, but ultimately the compensatory levies on livestock products pass on the cost of income redistribution to the consumer. If the stock-farmer switches from products subject to a market organization to other feeding stuffs, there may even be over-compensation of the cost disadvantage.

## Distribution of the burden between the government budget and the consumers

The manner in which income transfers to agriculture are financed depends closely on the instruments of income policy employed.

The present system is far and away the most advantageous in budget terms, since the costs of the policy are borne by consumers through increased internal market prices. The government budget is involved only if and insofar as internal consumption (at set prices) differs from internal supply. If the degree of self-sufficiency in a product falls short of 100%, producers and government both "profit" at the consumer's expense. If the self-sufficiency level for a product exceeds 100%, redistribution is partly at the government's "expense".

Any other form of income redistribution involves very heavy expenditure for the government, since in that case the total transfer of income to agriculture must go through the budget. There is no burden on consumers, not at any rate through prices. This ultimately means that the income redistribution from other sectors to agriculture depends on the tax structure rather than on the rate of consumption of agricultural produce.

## Trade with non-member countries

Stimulation of production and the decline in consumption cause under the present price policy, compared with others forms

of incomes support, the greatest drop in the EC's import requirement (or the largest increase in its export surplus). For non-member countries, this *ceteris paribus* means reduced outlets on the EC market and a greater (subsidized) supply from the EC on world markets. Furthermore, the variable import levies applied under this system represent an additional administrative obstacle to access to the EC.

This negative effect of the increased degree of self-sufficiency on non-member countries' agricultural trade with the EC is more or less compensated if and to the extent that the extra use of resources in agriculture entails an increased import requirement (or smaller supply for export) of goods and services in other economic sectors. The regional pattern of the EC's external trade (including relationships with poor and rich countries) is influenced in this way, but it is difficult to discern quite how.

As a consequence of distortions in price relationships and the resultant substitution in production and consumption of agricultural products, the composition of the reduced imports of agricultural products too (including feeding stuffs) is significantly altered and this leads probably to a substantial change in the distribution of imports according to region of origin.

Since there is practically no impact on consumption and very little on production, general subsidies per hectare and direct income payments to farmers would have a much smaller influence on the EC's agricultural trade with non-member countries.

Deficiency payments, subsidies per hectare for specific crops and income subsidies per animal are in an intermediate position. The effect on trade with non-member countries is almost exclusively a result of alterations in the volume and composition of EC production.

Regional distribution of production and income in the EC; monetary compensatory amounts

Common prices are an indispensable condition for achieving an optimum regional distribution of production within the EC. In theory, this condition can be met under all the alternative policies examined, but in practice there are differences.

The present price policy gives support to a limited number of products. The resultant alterations in price patterns cause producers of livestock products, who employ agricultural produce as feed, to alter the composition of that feed. The products subject to a market organization, which rise in price, are substituted by products, which remain cheaper as they do not fall under a market organization. If this substitution also results in raw materials of EC origin being replaced by those imported from non-member countries, alterations in the transport cost ratios for farmers in areas near the EC's import harbours (Netherlands, Belgium, Brittany, North Italy) can give them a competitive advantage over farmers in more inland situated areas.

Such a relative competitive advantage hardly occurs under a system of deficiency payments since consumer prices do not then change; yet regional changes in production do take place under a deficiency payments system just as they do under the present policy. Producers in regions with the highest production per unit of input moreover receive relatively the highest income support.

Factor-related income subsidies do not provide the extra incentive to concentrate production in areas with the largest production per unit of input and in the case of direct income payments to farmers, there may even be, depending on the criteria for their grant, a relative disadvantage for areas with good conditions for production.

The differences discussed above in effect on the distribution of income between consumers, government and producers mean that the alternative policies differ at the same time in respect of the distribution of benefits and burdens among the Member States of the EC. The most significant difference is that under the present policy the greatest burdens are borne by countries with the highest per capita consumption of foodstuffs, whereas in the case of deficiency payments and different kinds of income subsidies these burdens are mainly borne by countries with the highest per capita national income.

The alternative policies all make it possible to replace the under the present policy existing system of monetary compensatory amounts by producer subsidies differentiated by Member State. This would eliminate the internal price distortions in the EC but there seems to be a real danger that such subsidies, like the MCA's, would give the Member States too much scope for running a national policy. Financing would also remain a point of dispute.

#### Employment and land utilization in agriculture

This report pays practically no attention to the effects of the alternative policies studied on employment and land utilization in agriculture. In principle, these effects should not differ greatly from one policy to another. With regard to employment, the number employed in agriculture depends in the first place on the ratio between incomes per worker inside and outside agriculture and on the employment situation outside. All the alternatives presuppose the same income level in agriculture. The differences in effect on employment in agriculture are accordingly almost entirely connected with differences in income distribution. The level of employment is higher under all alternatives than in a situation without any form of income support 1).

- 1) Apart from differences in employment in agriculture, the alternative policies may differ with regard to the creation of employment in the supplying and processing sectors. These result from alterations in the demand for inputs and agricultural outputs. It is, however, not easy to assess the scale of these differences.



Apart from independent non-agricultural demand, there are practically no alternative uses for land. If we ignore any cost of inputs complementary to the input of agricultural land, which could have been used elsewhere, then there are practically no social costs in use of land for agriculture. Apart from temporary withdrawal of land from use in order to avoid surpluses, reduction in the use of this production factor is not really profitable <sup>1)</sup>. Increase in the area is impossible since practically all available land is already cultivated in the EC.

These conclusions are equally true for all alternative policies.

### 1.3 Alternative forms of income policy with direct supply control: quota arrangements

Three forms of quota systems are discussed in Chapter 3. Their object is to control the supply of agricultural produce. After a brief discussion of the concept of market balance, attention is successively paid to price guarantees for an EC-wide production quota (also called mixed price system, with the co-responsibility levy as variant), price guarantees for quotas awarded to individual farm firms, and finally to deficiency payments for quotas allocated per farm firm. Two situations are distinguished for each of these three quota systems, one where the level of price support for the quota quantity is the same as under the present policy without quotas, and one where the drop in agricultural income resulting from the quota system is offset by an increase in prices for the quantities produced within the quota.

In Annex 2 to this report, graphs summarize the similarities and differences between these three quota systems and the forms of price support discussed in Chapter 2 (given the same income transfer to agriculture and the same supply elasticity of supply for each producer). In Annex 3 - solely for the purpose of illustration - these similarities and differences are expressed in quantitative terms.

#### Volume of production and consumption; market balance

Where the price guarantee is restricted to a specific quota while the price level remains the same, the producer generally suffers a drop in marginal revenue when this quota is exceeded. This applies to all quota systems. With a mixed price system, however, this drop is much smaller than where the quotas are awarded

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<sup>1)</sup> Reduction in the use of land for agriculture could even be socially undesirable if this were to lead in an increase in imports of feeding stuffs or other agricultural products.

per farm. In the first case the overall drop in revenue is apportioned among all the units produced by all the producers. The marginal revenue per unit remains constant and the same as the mixed price. Where the quotas are awarded per farm, the individual producer receives the full price support for his units produced within the quota, and the effects of exceeding the quota are felt exclusively by the last units produced. Marginal revenue is thus not constant but falls sharply at the point where production exceeds the quota. The result is that where the quotas are awarded per farm, the amount produced in excess of the quota is much smaller than under a mixed price system. The system of fixing the quotas per farm is a more effective instrument for controlling production therefore, since the individual farmer receives a clearer price signal than with a mixed price system.

In practice, even with a system of quotas per farm, the quota for the whole of the EC can be exceeded. This is the result of differences in marginal cost curves (i.e. differences in elasticity of supply) from one producer to another. A producer with a relatively steep marginal cost curve will be more inclined to exceed the quota assigned to him than a producer whose curve is relatively flat.

It was demonstrated in the foregoing paragraph that government-financed income support lead to a higher level of consumption than market price guarantees do. This is also the case where both forms of price support are applied in conjunction with a quota system. It follows that a combination of deficiency payments and quotas per farm firm is the most effective means of promoting market balance: supply is restricted and demand remains at the level it would have reached without any form of price support. Less effective is a system of price guarantees for the quotas per farm firm: supply is restricted but demand feels the full effect of the price support. Lastly, a mixed price system contributes only very slightly to the achievement of market balance: supply is hardly restricted at all and demand is at the same level as with price guarantees for the quotas per farm. Where the price level is raised under a mixed price system - to offset the loss in agricultural income - there is even a loss of market balance: supply is not restricted and the increase in prices curbs demand further.

#### The level of agricultural incomes

Restricting the price guarantee to a specific quota causes revenue to farmers to fall. The reasons are a drop in production and a fall in revenue per unit for units produced in excess of the quota.

Lower production means not only less revenue but also lower costs: the resulting reduction in income is thus smaller than the reduction in revenue. The fall in revenue for the quantity produced in excess of the quota is not offset by a fall in costs: in

this case, therefore, the reduction in income is equal to the reduction in revenue.

It has already been shown that the mixed price system results in the production quota being exceeded to a greater extent than does a system of quotas per farm. This means that where the price level remains the same a smaller proportion of the decrease in revenue is offset by a decrease in costs. It follows that the introduction of a mixed price system results, where the price level stays the same, in a greater loss of income for agriculture than the introduction of a system of quotas per farm. There is no difference in this respect between quota systems with price guarantees and those with deficiency payments.

If the reduction in income is to be avoided, it is necessary to have a greater price increase for the units produced within the quota under a mixed price system than under a system of quotas per farm. In addition, under a mixed price system this price increase completely cancels out the effect of quotas. Furthermore, although the result of the increase under a system of quotas per farm is to restore the old income level, the income distribution is changed. Farms whose price elasticity of supply is relatively high, are overcompensated, while farms whose price elasticity of supply is relatively low are undercompensated. Differential price supplements could prevent this, but they on its turn present problems with regard to government financing and administrative feasibility.

#### Social costs

Because of the smaller input of resources and the reduced price distortions on the supply side, a price guarantee for the quotas per farm results in lower social costs than the present price policy or a mixed price system. This cost advantage on the supply side is not affected by increasing the level of the guaranteed price for the quantity within the quota. Such an income support measure still gives rise to increased costs on the demand side, but to a lesser extent than with a mixed price system because the price rises by a smaller amount.

A system of deficiency payments for quotas per farm results in the lowest social costs, leaving out of account any costs arising from the redistribution of incomes via the government budget. Theoretically, the quota could be fixed so that there were no costs either on the demand side or the supply side. In practice, social costs arise on the supply side here too as a result of the abovementioned differences in individual marginal cost curves.

#### Charges for the government budget and for consumers

As long as the price level remains constant it makes no difference to consumers whether the present price policy is supplemented or not by quota systems. However, where the introduction of a quota system leads to price increases to offset the loss of income in agriculture, the charges for consumers are greater than

under the present policy. The mixed price system then gives rise to the highest charges.

For the government budget, at all events, the charges are reduced as compared with a policy of no quotas. Naturally, even with a quota system the budgetary charges are much greater in respect of a system of deficiency payments than under a price guarantee policy.

#### Trade with non-member countries

A system of deficiency payments with quotas per farm is the most attractive from the point of view of sales by non-member countries. The demand from consumers in the EC is the same as without any kind of price support and, although the competing supply from EC producers is higher than where there is no support, it is lower than where there is a price support policy without quotas.

A price guarantee system with quotas per farm is more attractive to non-member countries than the present price policy because EC production is lower; there are no advantages on the demand side. A mixed price system has no advantage for non-member countries and even entails a disadvantage by reducing demand in the EC when price increases occur to make up producers' incomes.

#### Implementation

Of the three types of system, a mixed price system is technically and administratively the easiest to implement. The other two systems can raise more problems. The nature of these problems varies depending on the product. For products such as cereals and sugar, for instance, it is difficult to find a sound basis for apportioning the quota, as yields per hectare can fluctuate considerably from year to year because of the weather and the area sown fluctuates because of the extensive possibilities for substitution in the arable sector. For milk, these problems are not so great because yields per cow are much less dependent on the weather and there are fewer possibilities for substitution in the dairy sector. Milk, however, has the disadvantage compared with, say, sugar that monitoring the quota involves far more enterprises (both farms and processing enterprises). Where a price guarantee system with quotas per farm is applied, it is also more difficult with milk than with sugar to prevent quantities produced in excess of the quota from being marketed by bypassing the normal channels: milk can be sold directly to consumers, sugarbeet can not. This problem of market separation does not arise under a system of deficiency payments with quotas per farm, because there is no difference in consumer prices between quantities produced within and above the quota.

The abovementioned administrative problems and possibilities are meant only as an illustration. An exhaustive enumeration in respect of specific products is outside the scope of this report and calls for further study.

## Farm structure and regional distribution of production

Quota systems can in the long term give rise to appreciable social costs where their fixing by farm or by Member State impedes the development of farm structure and the regional distribution of production in the EC. The quotas must therefore either be transferable or else reallocated at regular intervals, for instance every year (in the latter case perhaps on the basis of the total quantities produced in previous years, and not only those produced within the quota).

In the case of a mixed price system or a system of quotas per farm, it will probably be difficult to avoid apportioning quotas per Member State, as is the case now with sugar. The quota would then be valid for a lengthy period and not transferable between Member States. In addition, there would be problems in finding a basis for the initial apportionment of the Member States' quotas after the introduction of such a system.

Making quotas transferable could result in their fetching a price which led to a redistribution of income and capital between holders and non-holders. Furthermore, it is probable that in the long run the costs of acquiring quotas will be included in the costs of agricultural production and that this will lead to an increase in price support.

The conclusion is that quotas per farm are an attractive proposition for the EC economy and EC agriculture as a whole; however, certain conditions must be met and this raises a number of problems.

### 1.4 The influence of EC policy on the world market prices of agricultural produce

In the foregoing it has been assumed that the world market prices of agricultural produce are independent of the policy followed in the EC. Chapter 4 contains some remarks on the consequences for the EC and for world markets of abandoning this assumption.

With dependent world market prices the influence of the present price policy on government expenditure and social costs would be different from the description given in Chapter 2. The price policy leads to a reduced need for imports to or an increased surplus for exports from the EC, which tends to depress world market prices. With a degree of self-sufficiency of less than 100% this means an increase in government revenue because import levies rise by the same amount by which world market prices fall. This is detrimental to the foreign currency earnings of non-member countries and gives the EC a social benefit. With a self-sufficiency rate of more than 100% a fall in world market prices

leads via higher export refunds to increased government expenditure and social costs. The EC suffers a drop in export earnings.

The same conclusion can be drawn in respect of all forms of price and income support mentioned in Chapters 2 and 3 which lead to a reduced need for imports or a larger surplus for exports. The point where advantages become disadvantages is always at a self-sufficiency rate of 100%. With quota systems, the disadvantage of an increased surplus for export is borne wholly or in part by producers.

Annex 3 illustrates these effects on government expenditure, agricultural incomes and social costs in situations of independent and dependent world market prices.

The influence of EC policy on world market prices can make it more attractive, from the point of view of minimizing government expenditure and social costs, to take a part of production into intervention rather than sell it to non-member countries. In this way, intervention can save public funds.

Whether the intervention stocks thus formed, which are not saleable commercially, are disposed off with the aid of subsidies inside or outside the EC depends on the possibilities for market separation and on the corresponding price elasticities. If these elasticities are equal, sale within the Community is preferable from the point of view of social costs.

Chapter 4 concludes with an examination of the influence of the EC mechanism of variable levies and refunds on the stability of prices on world markets. It is argued that this mechanism - which helps to achieve stability on the internal markets - increases price instability on world markets. The fact that the levies and refunds are variable means that the world market can no longer benefit from the increased absorptive capacity of consumers in the EC, while the fluctuations in production within the Community must be absorbed elsewhere.

The mechanism of intervention on the internal market can be seen as a first attempt to lessen these disadvantages of EC policy for the world markets.

## 2. Alternative forms of income policy without direct supply control

### 2.1 Present price policy

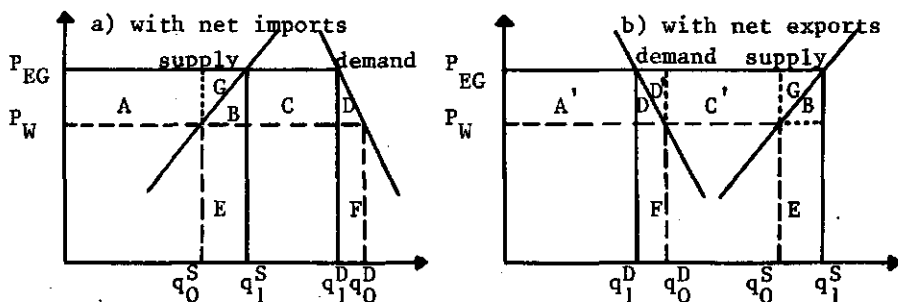
#### Mechanism

The present Community price policy is designed to secure a reasonable level of agricultural income through support of the market prices for various farm products. Price support has meant that, as a rule, the price of these products are higher, both at the farm gate and for consumers, than equivalent world market prices. The price support system uses levies and refunds to establish minimum price levels for imports and exports of agricultural produce. If there are irregularities in internal supply owing to an absence of outlets in non-member countries, and the measures taken at the frontier prove ineffective as a result, these are then supplemented by intervention on the internal market. 1)

#### Effects on production, consumption and income

The theoretical effects of the present price policy for a specific product are shown in figure 1. Figure 1a gives the situation for a product where the EC is a net importer and figure 1b is for a product where the EC is a net exporter. 2)

Figure 1. Effects of the present price policy



- 1) The Institute's publication 1.15 contains a full description of the present price-support mechanism (Doeleinden, instrumenten en effecten van het huidige landbouwbeleid in de EG - Objectives, policy instruments and effects of the present EC agricultural policy).
- 2) Figures 1 to 5 are also given in a slightly different form all together on the same page in annex 2 in order to make it easier to compare the various price support systems discussed in this report with one another.

Support of the market price  $P_{EC}$  at a level above the world market price  $P_W$  causes demand, at given elasticities of supply and demand, for the product in question to fall from  $q_0^D$  to  $q_1^D$ , and supply to increase from  $q_0^S$  to  $q_1^S$ , thus giving a greater degree of self-sufficiency. The consequences of this are expressed in the triangular and rectangular areas designated by the capital letters.

An increase in the price and the quantity produced above the level that would be reached without any form of support brings an increase in revenue for the agricultural producers in question of  $A+G+B+E$  in the net import situation and of  $A'+D'+D+C'+G+B+E$  in the net export situation. In both cases these are offset by increased costs resulting from greater use of resources owing to the growth in output. Assuming that the supply curve is equal to the marginal cost curve this cost increase is equal to  $B+E$ . The result is an increase in income for the producers which in the net import situation is equal to  $A+G$  and in the net export situation is equal to  $A'+D'+D+C'+G$ .

The result of price support for the consumers is that expenditure in the net import situation increases by  $A+G+B+C-F$  and in the net export situation by  $A'-F$ . Consumers also suffer loss of utility (or welfare) through the fall in consumption of the supported product. Assuming that the demand curve is equal to the marginal utility curve (or for the processing sectors the marginal revenue curve) this utility loss is equal to  $D+F$ . The total loss for consumers is therefore  $A+G+B+C+D$  for net import and  $A'+D$  for net export. For consumers this is equivalent to the loss of consumer's surplus and for the processors it represents lost income.

For the treasury price support results in the receiving of a levy amounting to  $P_{EC}$  minus  $P_W$  for the net quantity imported.  $C$  represents the revenue from this levy. In the situation of net export refunds must be paid and the consequent expenditure is  $D'+D+C'+G+B$ .

#### Social costs and income distribution

The result so far as producers, consumers and the official budget are concerned is that whenever the EC price level is higher than world market prices, income is redistributed from the consumer to the producer. With net imports, income is also redistributed from the consumer to the budget and with net exports from the budget to the producer. 1)

1) Since at this point world market prices are assumed to be independent we shall disregard official expenditure on surplus stocks for purposes of intervention. Intervention expenditure which merely serves to bridge differences in space and time between production and consumption need not be taken into account because it is assumed that this kind of stabilisation policy would also be followed in a situation where no price support was given.



The overall result for producers, the budget and consumers of the income and utility changes is equal to  $-(B+D)$  1) both in the net import and net export situation. The redistribution of income therefore entails on balance a net loss of income or utility to the EC economy. This loss represents (in times of full employment) the social costs of the policy governing the product in question. 2)

Part D of this loss consists of the utility foregone as a result of internal consumption moving from  $q_0^D$  to  $q_1^D$ . This represents the loss of income due to reduced internal sales in subsequent economic sectors resulting from shifts in production in agriculture and the loss of utility suffered by consumers. National income experiences a loss because of the ensuing shifts of production but is not affected by the loss of consumer utility. However, the total loss D must be included in the social costs of the policy.

Part B of the social charges relates to the production side of the model and in times of full employment finds expression in its entirety in the national income. B represents the difference in costs incurred as a result of increased agricultural production ( $B+E$ ) and the savings in imports and additional value of exports respectively derived from this increased production (E). With full employment the decline in output in other sectors because the resources are switched to agriculture and the costs of increased imports go to make up the additional production costs. In times of unemployment these costs are lower in economic terms. Here too, however, costs are always incurred because any expansion of production is in fact coupled with additional calls on resources such as fossil fuels, which, unlike labour, are in scarce supply. In this case the economic revenue from the additional agricultural production amounts to E, this being the world market price multiplied by the additional quantity produced ( $q_1^S - q_0^S$ ).

We may therefore conclude that the total effect on the national income of the present prices policy is, with full employment, at least  $-B$  less part of D, and, with unemployment, is at most  $+E$  less part of D. The social effect of price support is therefore greater than the national income effect. The difference between the two comprises the consumer utility effect, which by definition is reflected in the social costs but not in the national income.

- 
- 1) For net import:  $(A+G)+(C)-(A+G+B+C+D) = -(B+D)$ ;  
for net export:  $(A'+D'+D+C'+G)-(D'+D+C'+G+B)-(A'+D) = -(B+D)$ .
  - 2) Here (and in sections 3.2 and 3.3) we are not concerned with the social effects that accompany income transfers to or from the central budget (taxation, subsidies, etc.). These amount to relatively little in this section. In sections 2.2 to 2.4 and 3.4, where much larger public income transfers are involved than are encountered at present we shall be looking at their social effects.

Agricultural policy is primarily a policy of income redistribution

The size of areas B, D and E is determined by the long-term price elasticities of demand and supply for the supported product and by the amount of price support given. Without attempting to measure effects in quantitative terms we can establish that triangles B and D are smaller in every case than the sum totals of the remaining rectangles and triangles A+G+C and A'+D'+C'+G respectively. This leads to the general conclusion that the social and economic effects of the present common agricultural policy - and as we shall be seeing also of the alternative policies - are much less substantial than the income distribution effects. The income redistribution effects of the policy, in so far as it affects consumer expenditure and the central budget, are therefore of much greater significance than its social costs or the national income effect and should therefore be viewed separately. The common agricultural policy is to a substantial degree an income redistribution policy.

#### Effects on non-member countries

Income is not only redistributed as between sectors and groups within the Community but also between the Community and non-member countries. The increase in production and the decline in consumption of agricultural products enable the EC to benefit from foreign currency savings of E+F at the expense, therefore, of non-member countries. The policy reduces non-member countries' trade outlets on the EC markets and this is only offset to a such lesser degree by increased imports of other products (agricultural raw materials including animal feedstuffs, non-agrarian consumer goods). This will be considered in greater detail when we come to discuss the policy's effects on unsupported products.

#### Quantifying of effects; differentiations per product

These theoretical assumptions would be much more cogent if it were possible to quantify the various effects. Generally speaking the requisite statistics for the volume of production, consumption and exports and imports are available for the individual products although it is more difficult to assess the actual extent of price support since one can only make a rough estimate of what the appropriate world market prices should be. The greatest difficulty of all, however, lies in trying to predict the long-term price elasticities of supply and demand for the supported products. Any analysis of the impact on prices will be severely hampered by the substitution effect (cross-price elasticities) that frequently operates between the supported products and their substitutes. For the moment, therefore, we cannot formulate estimates based on actual products but what we have done is to calculate the effects of alternative policies on two imaginary products, using arbitrarily selected price levels and price elasticities. These figures are

given in Annex 3 to this report and are meant to serve solely as illustrations.

It has already been observed that the social costs of the current price policy are small in comparison to the income redistribution effects. With low price elasticities of supply and demand, the social costs will also be relatively small in absolute terms. On the other hand if a policy applied to products with higher elasticities of demand and/or supply, this would entail much greater social costs. Not surprisingly, therefore, the present policy's most stringent form of price support (target pricing) is still confined to such products as grain, sugar and milk which are market by relatively low price elasticities of supply owing to the fact that any rapid growth of supply in these land-related products would be impeded by the limited amount of land available. 1) The demand for these products is also relatively insensitive to price changes because of their substitutability. A stringent form of price support for products with greater price sensitivity, such as pigmeat, poultry, eggs and horticultural produce, would presumably soon trigger of a sharp increase in production with all the adverse social effects this would entail.

#### Impact on unsupported products

The present policy also affects unsupported products. All these effects are expressed in theoretical form in the triangular and rectangular areas in figure 1. If substitution is possible in respect of the supply of agricultural products, supply becomes more elastic and triangle B and rectangle E increase in size. If substitution is possible on the demand side and the demand for agricultural products accordingly becomes more elastic, then areas D and F become greater. We shall examine this in greater detail.

The B triangle is formed by the difference between the increased revenue from the supported product (E) and the loss of revenue suffered by other products or from additional imports (B+E). The additional revenue could be lost from industrial production but it could also come from agricultural production, especially if the products in question are land-related and the land input can be switched from unsupported products to those in receipt of support.

Consequently, in the EC the production of potatoes and high-

- 
- 1) It is debatable whether this underlying assumption of the present price policy does in fact apply to milk. In the Netherlands, where the consumption of concentrates made up from imported raw materials is growing in both absolute and relative terms, milk production is becoming increasingly less related to land-usage. This has meant a higher price elasticity of supply, which, if the present price policy is adhered to, will lead to greater social costs.

protein animal feedstuffs, such as luzerne, has declined while production of grain and sugar has increased. The fall in potato production remains a limited one because this product has a low price-elasticity of demand and there is little international trading in potatoes. Consequently, any reduction of output is immediately followed by a rise in price and it becomes relatively competitive again. High-protein feedstuffs, on the other hand, have not experienced any internal price increases because their prices depend largely on world market prices. Consequently there has been a sharp cutback in the amount of high-protein animal feed being cultivated in Europe, while potential new crops, such as soya, have been placed at such a competitive disadvantage from the outset that they can probably never get under way.

One of the first substitutions that can be made as regards the demand for agricultural products (which in this case also increases the supply of supported products) is for the stock-farmer to produce his own animal feed. If there is an increase in grain and milk prices, it then becomes more attractive for the producer to sell that produce than to use it for his own farm feedstuffs, and he will try to purchase a supply of the cheaper feedstuffs to satisfy his own requirements. This chain of events is demonstrated by the fact that less milk is being consumed on the farm where it is being replaced by purchased feedstuffs that are mainly vegetable in origin and consequently a higher percentage of milk output is then supplied to the dairy processors.

There will also be a move in the feedstuffs industry, where it is technically possible, to replace supported products with other low-cost raw materials which can either be imported (virtually) duty-free, from non-member countries (e.g. tapioca, soya, citrus pulp) or possibly come from within the Community (one could instance, say, legumes or luzerne). This leads to higher prices for the unsupported domestic products and/or greater imports of duty-free products from non-member countries. Set against this, one has reduced imports and/or increased exports of price-supported products.

Raw materials not subject to the pricing system can also be substituted for supported products by the food and drink industry, by consumers in their shopping or by other end-users.

In all these cases the changes in relative prices lead to substitution effects in the demand for agricultural products and thus bring about greater elasticity of demand and a flatter demand curve in figure 1.

Despite the replacement of supported products by cheaper raw materials price support does result in a net increase in the price of foodstuffs and animal feed. In each case the product pattern chosen is bound to be less advantageous than the optimum alternative would be without any form of price-support.

Indeed, in intensive livestock farming the increase in the

cost of animal products resulting from the higher price of feed is offset by levies and refunds on imports and exports of the final product from and to non-member countries. This pushes up the internal price level of pigmeat, poultry and eggs and the effect of the higher price of animal feedstuffs raw materials is passed on to the consumer.

The foregoing leads one to conclude that the present price policy not only influences the supported products themselves but also affects other agricultural products. This applies to both supply and demand. The extent of this influence depends on the amount of substitutability and on the degree which prices change in relation to one another. A substantial proportion of the social costs of the agricultural policy is determined by this relative substitutability.

The substitution effects also have an impact on trade with non-member countries, as well as on the internal market. For example, support of the grain price causes grain imports to be replaced by imports of other - untaxed - feedstuff raw materials. However the eventual balance of imported feedstuffs will be lower than it would be if grain prices were not supported owing to the fall in demand referred to earlier as a result of the net increase in costs incurred by the producers of slaughter animals. 1) Furthermore, the substitution of untaxed feed components for those that are taxed will affect the regional pattern to trading between the EC and non-member countries. Whether this may or may not eventually be to the advantage of, say, the developing countries is not examined in this context.

#### Regional distribution of production and income in the EC

Regional specialisation depends on there being single prices under the present price policy, although owing to monetary problems these have yet to be fully achieved. Theoretically the conditions for regional specialisation within the Community would also be created if there were uniform prices in the EC set at the world market price level, i.e. without any form of price support. In practice the latter is quite out of the question and this has helped the present price policy to contribute to greater freedom of trade in agricultural products in the EC. In so far as this has actually brought about the intended regional specialisation, European agricultural productivity will also have increased.

Indeed the aforementioned shift from unsupported to supported products in the pattern of production has resulted in there being a different regional production distribution than would have been the case if all products received the same price support. Regions with relative cost advantages for products other than supported products are now producing the supported products.

1) There was seen to be an increase in the need to import animal feed components as a direct result of support being given to milk prices.

products are now producing the supported products.

In intensive livestock farming the shift in demand from supported to unsupported animal feed components (together with the fall in output of the latter) can result in relatively higher imports of raw materials from non-member countries. Because of alterations in transport cost ratios livestock farmers in areas close to the import harbours have relative cost advantages over farmers in EC regions further inland. This could well have a bearing on the fact that intensive livestock farming is concentrated in the Netherlands, Belgium, Brittany and Northern Italy.

Apart from affecting regional production distribution, price support has also given rise to regional income distribution effects in the EC. The redistribution of income as between producers, the budget and consumers noted earlier has in fact also meant a redistribution of income between the EC Member States whereby Member States with a low degree of self-sufficiency in the supported product are transferring income, via consumer prices, to Member States with a high degree of self-sufficiency. The heaviest burden is falling upon those countries with the highest per capita consumption.

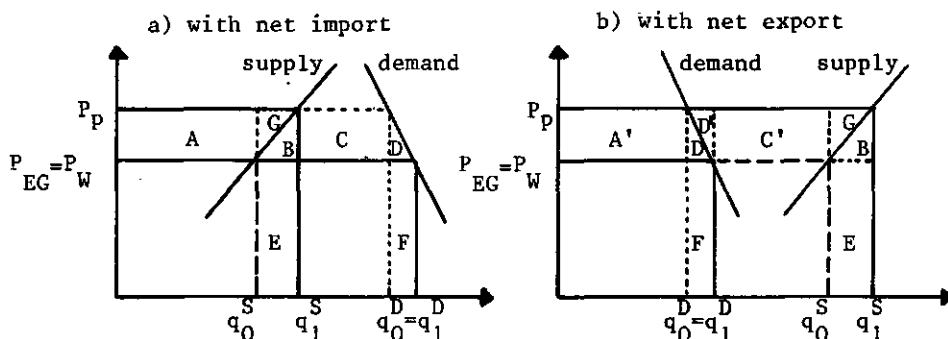
## 2.2 Deficiency payments (price subsidies per unit of output)

Having described in some detail the effects of the present form of price support, in this and the following sections we shall be looking at a number of alternative methods of achieving the income objective using different policies from those followed hitherto. As in the previous section, the effects of the alternative policies will be explored by comparing them with situations in which no form of price or income support is given and the differences in the effects of the present policy and the policy under discussion will be considered.

### Mechanism

The desired income support that a farmer derives from a particular product can also be achieved without raising the market price of that particular product. The gap between the actual market price and the desired producer price can for example be bridged by a payment from the Treasury of a price subsidy per unit of output. This system of "deficiency payments" was operated for many years in the United Kingdom and is used in the EC for some less important products (including durum wheat, tobacco, dehydrated forage and various seeds). A system entirely comparable with deficiency payments was also employed in the Netherlands between September 1973 and May 1974 when the VAT rate on farm products was temporarily raised in order to cushion the effects of the revaluation of the Guilder.

Figure 2. Effects of deficiency payments



#### Effects on production, consumption and income

Figure 2 represents the market situation for a particular product that is subject to deficiency payments. 1) The market price  $P_{EG}$  is equal to the stabilised world market price  $P_W$ . The producer price  $P_P$  is reached by means of a deficiency payment  $(P_P - P_W)$ .

On the supply side the deficiency payment causes production to be expanded from  $q_0^S$  to  $q_1^S$ . The volume of production is therefore as large as it is under the present system. The effects for the producers are consequently also the same. The value of production increases in the net import situation by  $A+G+B+E$  and in the net export situation by  $A'+D'+C'+G+B+E$ . The take-up of inputs increases in both situations by  $B+E$ , so that the income for the producers increases by  $A+G$  and  $A'+D'+C'+G$  respectively.

There is no change in consumer prices in relation to the situation where there is no price support. Consequently, there are no price-effects on the quantity consumed, consumer's expenditure or utility. In comparison with the present policy there is therefore a lower price level and consequently less utility loss.

Set against lower prices to consumers there is higher public spending which must be financed by taxation, saving on other areas of public spending or monetary policy. The central budget must in fact make up the difference  $(P_P - P_W)$  and therefore incur expenditure which is equal to  $A+G+B$  in the net import situation and to  $A'+D'+C'+G+B$  in the net export situation.

1) The reader is again referred to Annex 2 where all the graphs for the various forms of price support, including figure 2, are reproduced for purposes of comparison.

## Social costs and income distribution

With the deficiency payments system income is therefore only redistributed between the central budget and producers and the burden of it does not fall, as it does at present, upon the consumers via prices. If we disregard the social costs of taxation etc., the outcome of the redistribution effects is equal to  $-B$ .<sup>1)</sup> In times of full employment in this case  $-B$  is both the social effect and the national income effect of deficiency payments. In times of unemployment the attraction of means of production to provide the additional agricultural production entails fewer costs for the economy than  $B+E$ , thus giving a maximum social and national income effect of  $+E$ .

So long as the social costs of taxation (savings on other areas of public expenditure or monetary financing) are negligible or slight, a system of deficiency payments will be socially more beneficial than the present price policy, due to the fact that consumers are not affected via prices. The maximum value of this benefit is  $+D$ .

In fact additional public expenditure on agricultural policy is likely to be accompanied by a substantial increase in social costs. Taxpayers will suffer a loss of utility and there will be some groups who find themselves faced with public spending cuts or lose out on income transfers, while others will be hit hard by inflation. There will also be the cost of tax collection etc. If we assume that deficiency payments are financed via progressive taxation, the social costs of this system will still be less than at present, despite the loss of utility. Any transfer of income to agriculture via prices means that the lower income groups have to contribute just as much as the higher income groups, given that the food requirements are the same. For the lower income groups, however, this represents a relatively larger proportion of income than for the higher income groups. The loss of marginal utility as a result of the income transfer is therefore greater for the first group than it is for the second. Progressive taxation is specifically designed to ensure that all income groups are subject to the same loss of marginal utility as a result of income transfers to the budget. Therefore any income transfer to agriculture via progressive taxation would result on average in a lower loss of utility than an income transfer effected by means of consumer prices.

From what has just been said it would appear necessary, when judging alternative forms of income transfer in the context of agricultural policy, to distinguish between those who consume agriculture products and those who pay taxes (usually referred to

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1) For net import:  $(A+G)-(A+G+B) = -B$ ;  
for net export:  $(A'+D+D'+C'+G)-(A'+D+D'+C'+G+B) = -B$ .



in this report as "the central budget"). This may well be one and the same group of persons, but the way in which the burden of income transfer is distributed within that group may differ somewhat. Furthermore it will have become clear that there is no social advantage to be gained in replacing the present price policy with a deficiency payments system if, say, this system were to be financed by an increase in VAT on those foodstuffs currently subject to the price policy, by cuts in public expenditure or in income transfers at the expense of lower income groups. On the other hand if it were financed by an increase in VAT on all foodstuffs - or better still on all products - the deficiency payments system could be more advantageous socially than the present system, albeit to a lesser degree than if financed by means of progressive taxation.

#### Effects on non-member countries

Deficiency payments would benefit EC's balance of payments' current account less than the present system since no exchange savings would be made as a result of reduced consumption. As regards the situation where no price support is given, a maximum exchange loss of B can occur in times of full employment. Non-member countries would do better with deficiency payments than at present because they would have more outlets for sales on the EC markets. Internal demand would remain at the same level as that reached without price support, while non-member countries would reap an added bonus in so far as their access to the EC markets would be unimpeded by import levies. There is only one adverse effect so far as non-member countries are concerned and that is the fact that, as with the present price policy, they would have to face greater competition from an increase in EC production.

#### Comparison with present price policy

It would seem from the preceeding analysis that on balance deficiency payments would have fewer adverse effects on the EC economy as a whole than the present policy of price support. There would be no change in the situation for producers of the supported product while consumers and non-member countries would be better off with deficiency payments. They could, however, have some very adverse consequences, especially so far as the budget authority is concerned. The essential difference between a deficiency payments system and the present system therefore lies in the way the costs of the policy are distributed between the budget authority (i.e. taxpayers), consumers and non-member countries.

#### Regional distribution of production and income in the EC

Compared with the present policy, deficiency payments make for a different pattern of production, consumption and importation of agricultural products, while altering the distribution of in-

come between producers, consumers and central budget. This in turn affects the way in which production, consumption and income is distributed among the different EC Member States.

On the consumption side, there would then be no need for existing supported animal feed components to be replaced by unsupported products as consumer prices would not be affected by the deficiency payment, nor would there be anything like the relative increase in the use of imported unsupported feed components that has taken place under the present policy. The most that could be expected would be some increase in imports to offset the fall in the EC production of unsupported products. This means that, with deficiency payments, stock-farmers in regions near the import harbours would virtually cease to enjoy relative cost-advantage they presently derive from their relatively lower transport costs. In this respect a deficiency payments system would therefore be less favourable for, say, the Netherlands than the present price policy.

It is in the distribution of the costs of the policy followed that one would find a marked change from the present policy. At the moment these costs are largely distributed in proportion to consumer expenditure and countries with a relatively high level of food consumption currently shoulder the greatest burden of costs. Under a deficiency payments system the entire cost would be borne by the Treasury and would therefore be shared out in accordance with the arrangements for Community finance. With the current method of financing this would mean that countries with a high gross national product would bear the greatest burden.

Table 1 shows the different countries' shares, in 1974, in total gross value added at factor cost and in EC consumer expenditure on foodstuffs.

Table 1. The Member States' shares in total gross value added at factor cost and in consumer expenditure on foodstuffs in the EC (1974, current prices and exchange rates)

	Gross value added	Consumer expenditure on food
Federal Republic of		
Germany	33.1	25.7
France	22.6	20.9
Italy	13.5	19.9
Netherlands	6.1	5.3
Belgium + Luxembourg	4.9	4.3
United Kingdom	16.7	19.9
Ireland	0.6	1.1
Denmark	2.6	2.7
EC	100.0	100.0

Taken from Eurostat Yearbook of Agricultural Statistics 1977, Tables A4 and A6.

The table shows that, compared with the present price policy, a deficiency payments system would enable the cost burden to be shifted away from Italy and the United Kingdom largely to the Federal Republic Germany. This conclusion is confirmed if one takes into account the fact that when there is high per capita income, less of the money spent on food in the shops ends up in the farmer's pocket than it does when there is low per capita income because with greater affluence there is more demand for processing services (packaging, preparation, deep freezing etc.).

#### Effects on unsupported products

It was explained in the previous section that price support affects other products as well as those it supports. The knock-on effects of the present price policy occurred, as we saw, on both the demand and the supply side of the supported product. With deficiency payments there might well be price distortions on the supply side but not on the demand side, at least not directly. In this case the consequences of price distortions are therefore only felt at the production level.

So far as land-related products are concerned, deficiency payments would mean that, as with the present policy, the input of land for that supported product would increase at the expense of other products. Consequently the prices of unsupported products would eventually finish up at a higher level than if there had been no price support.

One would again find that producers of animal-based products would be inclined to market their home-produced animal feedstuffs if these were subject to price support (i.e. feed grain and milk) and then replace them with purchases of cheaper feedstuffs. For instance, the proportion of milk output retained by the farmer (and therefore not supplied to the processor) would be no greater under a deficiency payments system than it is under the present price policy and one might even expect to see more home-grown animal feedstuffs being replaced with bought feed than at present. With deficiency payments, however, the price of bought feed does not increase as a result, as it does under the present system. The price of self-produced (and supported) products therefore varies more in relation to that of bought feed with the deficiency payments system than it does at the moment. There would therefore be a greater tendency than at present for animal feedstuffs to be shifted from one sector of production to another via the market and the compound feed processors. While this can encourage specialisation and thus increase agricultural efficiency, it can also lead to waste by involving too many middlemen and processors. More products would then be placed in a situation comparable to that of skimmed milkpowder under the present policy, where the producer is able to sell his product to the dairy industry for a good price and then, because of the subsidy on skimmed milkpowder used in animal feedstuffs, can buy part of his own output back

again at a cheap price. The sole reason for the - otherwise unjustified - detour via the processor is the need to profit from the subsidy. It is difficult to say whether a deficiency payments system could be operated in such a way as to keep this loophole for wastage down to a minimum. What lies at the heart of the matter is the fact that there really is no way of separating producer prices from consumer prices when the products concerned are employed as agricultural inputs. This does present quite a considerable problem because agriculture itself plays an important part in the consumption of its own products.

Since relative prices and their levels on the internal market will, under a deficiency payments system, continue to correspond to those found on the world markets, the producers, users and importers of the raw materials for foodstuffs and animal feed will be able to frame their actions to take advantage of the international supply and demand in those products so that these would then be cheaper, in economic terms, than they are under the present policy. In this way there would for example be less of an inducement for consumers to replace butter with margarine and grain would be less likely to give way to soya and tapioca in the animal feedstuffs sector. Production costs in intensive livestock farming would also be lower than under the present price policy.

#### Differentiation of deficiency payments

Theoretically a deficiency payments system is more susceptible for use as a method of differential income support than a policy that acts by supporting the market price. It would be possible, for example, to vary the amount of the deficiency payment in accordance with the size of the farm, the quantities of products marketed, or according to the region. A deficiency payments system as such is a more refined method for achieving income policy objectives than the present price policy, although one should not underestimate the administrative problems attendant upon a differentiated deficiency payments system.

In this context attention should be drawn to the possibility of varying the deficiency payments according to the country in which they are applied, which is an alternative put forward by Heidhues and others (1978). This kind of differential system would provide more scope than the present system for bringing a country's agricultural incomes into line with those in other sectors of the economy, and could eliminate the need for the system of monetary compensatory amounts. The undesirable effects of exchange rate fluctuations on agricultural incomes in the Member State, or States, in question could be absorbed through differential deficiency payments (cf. the VAT adjustment in the Netherlands in 1973-74). This system would have the major advantage of eliminating internal price distortions in the EC, but major problems would be encountered in determining the scale of payments for

each country and in the question of whether the payments should be financed on a national or a Community basis. There also seems to be a real danger that such a system, like the MCAs, would allow the Member States too much scope for achieving national objectives at the expense of (agricultural) integration.

### 2.3 Factor-related income subsidies

#### Mechanism and general observations

The previous sections have been concerned with policies that provide support for farm incomes by the indirect means of guaranteeing revenue per unit of output. In this and the following section consideration will be given to forms of direct income support. In these alternatives, products are still priced on a level with (stabilised) world market prices.

This section looks at what are known as "factor-related income subsidies" or subsidies on inputs. These are subsidies allocated according to the size of productive factor inputs for the product in question. Most of the writings on this subject propose subsidies per unit of land. Occasionally, as with Marsh and Ritson (1971), subsidies per animal are mentioned, and investment subsidies (for stalling facilities, for example) may also be included in this category. The most detailed proposals for land-related income subsidies are those put forward by Binswanger and others (1977). Subsidies of this kind are already provisionally paid in the EC for minor crops such as flax, hemp, cotton and hops. In this section we shall confine ourselves to considering subsidies per unit of land or per animal.

#### Effects on production and consumption

Factor-related income subsidies are paid by the authorities direct to the individual producer. This form of subsidy does influence the input of productive factors and with it the total volume of output, but does not affect, at least not directly, the structure of the relative prices for the various agricultural products. There are no price increases either for producers or consumers, which means that in this respect this form of subsidy differs substantially from deficiency payments, where changes in the structure of relative prices do occur and the present price policy, where any change in prices affects both demand and supply. Since the relative price structure stays the same, the producer's marginal costs and marginal revenue for variable inputs (feedstuffs, fertiliser) are also unaltered. The amount of the output on which profit can be maximised is therefore different from that obtained under the present policy or a deficiency payments system. Generally speaking factor-related income subsidies result in lower variable inputs than price support and hence in a lower productivity per unit of factor input.

#### Land-related income subsidies: effects on the volume of production

An income subsidy on land cannot bring about expansion of the total input of this factor in agriculture. The production factor may well be redistributed among the different sectors of production thus escalating the volume of production in the supported sectors at the expense of the unsupported production sectors. In this respect this system is no different from the price policies discussed earlier. However, given the same level of income transfers there will be a greater tendency for land inputs to be shifted from unsupported to supported products. In this alternative, the subsidy will be directly linked to the land factor, whereas with price policy it is also possible to obtain income support by increasing the inputs of other resources (labour, capital, feedstuffs, fertiliser). Competition is therefore greater for the scarcest resource - land - than it is with the other alternative policies. This also means that there will be a greater increase in the price of land - which goes up in price whenever there is any form of general or specific income support in agriculture - than would be encountered with other forms of policy.

Misallocation of land-use does not occur, needless to say, if the hectare subsidy is based on the whole acreage and not related to the product farmed, but it would be possible to minimise the degree of misallocation with product-related subsidies if, when any replacement of the present price support with hectare subsidies took place, the amount of support did not compensate for the whole of the reduction of total revenue but only for the reduction in the difference between revenue and variable costs. In such cases there would also be an increase in the price of land.

#### Land-related income subsidies: social costs and income distribution

The lower level of production due to the fall in productivity mentioned earlier and the absence of price distortions in the demand for and supply of agricultural products mean that generally applicable hectare subsidies are certainly a form of income supplementation which entails lower social costs than those encountered with the present price policy or deficiency payments. Also where subsidies are allocated to specific products the comparative advantage of there being no change in the structure of the relative prices of the final products would presumably not be cancelled out by the loss of land due to misallocation within agriculture (not even if one allows for the additional social costs that would result from increased public expenditure).

The distribution of the burden of land-related income subsidies as between the authorities and consumers is wholly comparable with that found with deficiency payments: the entire cost of subsidies is borne by the authorities, and the consumer is subject to neither burden nor benefit so far as prices are concerned. This is therefore a different situation from the present policy, where

it is mainly the consumers who bear the burden.

The distribution of land-related income subsidies among the producers of farm products differs from the distribution of price support. Land-related subsidies are relatively more favourable for the producers with large amounts of land at their disposal regardless of productivity. Price support, on the other hand, benefits most those producers who have the highest output per hectare. It is quite clear from the figures published in, for example, the AERI's Business Survey's ("Bedrijfsuitkomsten in de Landbouw") and reports on the Commission's Farm Accountancy Data Network that the larger farms frequently produce more per hectare than the smaller holdings. Apart from differences in the shape of the marginal cost curve, this means that larger farms receive more support than smaller holdings because, besides having a greater land area, they also have greater productivity per hectare. A land-related income subsidy would cut out that particular advantage.

Land-related income subsidies: effects on non-member countries; regional distribution of production and income in the EC

For non-member countries the lower level of production means more outlets for their trade in farm products on the EC markets than they have with price support. Owing to the absence of import levies, accessibility is present on the same scale with land-related subsidies as it is with deficiency payments but on a greater scale than with the present price policy.

The difference in income distribution effects for the producers between price support and subsidies per hectare would also have an impact on the distribution of the benefits of farm policy as between the EC Member States because the yields per hectare vary from one country to another. The Netherlands, which has relatively high yields per hectare, would be worse off with subsidies per hectare than with price support.

The effects on the allocation of the burden among the individual Member States of a different distribution as between consumers and the budget are the same for land-related subsidies as for deficiency payments. Reference can be made to section 2.2 and to Table 1 in particular.

Land-related income subsidies: administrative feasibility; other considerations

Writers on the subject have opted for land as the factor on which the allocation of income subsidies should be based mainly for administrative reason since almost all the EC countries have a reasonably good system for registering the ownership and use of land. As a rule deficiency payments or other forms of income supplementation would be much less easy to administer.

Varying the level of income subsidy provides greater scope than the present policy for paying due attention to the social aspect of income policy. Binswanger and others (1977) suggest that

the subsidy per hectare should vary in inverse proportion to the size of the farm, thus enabling the smaller farms, which often have the most need of support, to derive the most benefit from it as well.

Another aspect of land-related income subsidies is that the authorities could use them to influence the way land is used and the intensity of land use. We saw earlier that the subsidy in itself already involves lower productivity than price support. This may be desirable not only for market equilibrium purposes, but also with a view to other policy objectives such as energy conservation (directly or indirectly through less use of artificial fertilisers) or environmental control. Furthermore it is possible to provide income support for products which, generally speaking, are not or cannot be disposed of via the market, a possibility which is either diminished with price support or even non-existent. Examples of this would be the production of forage by the farmer for his own use or scarce public commodities such as landscape, environment and life enhancement. One finds instances of this kind of subsidy at the moment such as the arrangements for hill farmers, the cultivation of luzerne etc. and, in the Netherlands, the management allowances. Finally, land-related income subsidies would enable land retirement incentive payments to be made, thus eliminating the production of surpluses which constitutes a much greater expense for the authorities and society as a whole. This is a possibility that is in fact exploited in the United States in the "set aside" programmes.

Income subsidies per animal: effects on the volume of production

There is no limit to the expansion of the size of the animal stocks, at least in the longer term, so long as sufficient feed is available although for biological reasons it is possible to increase the number of poultry and pigs much more rapidly than that of cattle. Moreover the traditional animal feed pattern in the EC is such that cattle numbers are much more closely related to the amount of agricultural land available in Europe than pig or poultry numbers are.

Income support per animal is a strong incentive to increase the number of those animals. If such subsidies were paid to poultry and pig farmers, an enormous increase in production in these sectors would soon be generated, with all the negative social effects this would entail. There is therefore no point in pursuing this alternative any further, especially since the present policy provides (virtually) no support for these product sectors either.

Support per bovine would have less effect on cattle numbers and could replace the price support which is given to milk and beef at present.

Beef-farming would be differently affected according to whether the income subsidy was payable per animal marketed or per animal on the farm. In the first case the effect on overall meat



production would be the same as with price support, provided that, as one would expect, the amount of the subsidy varied according to the weight of the animal marketed. A subsidy per farm animal could bring about a change in the productivity per animal. This would be likely to decrease in comparison with the present situation, while the number of animals present would increase.

Presumably the same would apply, only more so, to dairy farming. If the present price support for milk was replaced by income subsidies per animal, this would alter the relative prices of milk and feed concentrates, resulting in a fall in milk yield per cow, while the number of cows would tend to increase. Koester and Tangermann (1976) expected the number of cattle in the Federal Republic of Germany to increase to such an extent that milk production would eventually be higher than it is under the present policy. For the Netherlands, with its high concentrate-based yield per cow, and considerable animal-intensity per hectare, any such development following upon a system of income subsidies per animal would appear implausible.

Income subsidies per animal: social costs and income distribution; regional effects in the EC

If the trend anticipated by Koester and Tangermann holds good for the other EC countries, there would probably be only a very small social advantage to be gained from these income subsidies in comparison with the present price policy and there might even prove to be a disadvantage in social terms. Certainly there would be no price distortions in the demand for milk and dairy products (including those as between milk and skimmed milkpowder for feed purposes) but, on the production side, there would be greater misallocation in the input of resources. The increased public expenditure would also entail additional social disadvantages and even if there were no change in aggregate milk production, there would still be extra losses due to misallocation. It is plainly better to produce the same milk pool with a relatively small number of highly productive animals than with a larger number of less productive animals. The larger number of cattle would require not only more labour and capital (i.e. stalling facilities) but also more feedstuffs. The Dutch feed-rates show that, in fact, the total amount of feed for body maintenance and feed for production per unit of milk produced tends to increase once the average milk yield per animal starts to decline. One must therefore conclude that income subsidies per dairy cow are virtually certain, on the basis of Koester and Tangermann's assumptions, not to be more advantageous in social terms than price support.

As regards the distribution of the burden of the policy between the authorities and the consumer, this alternative is entirely comparable with the forms of deficiency payments and income subsidies discussed earlier. On the other hand the way the benefit

is distributed is different from other alternatives. Income subsidies per animal generate a higher income for producers with low-productive animals and a lower income for producers with highly-productive animals than is the case with the present price policy. This also means that the introduction of income subsidies per animal has repercussions so far as the distribution of production and agricultural income among the various EC Member States is concerned. For the Netherlands, for example, the situation would be more unfavourable than it is with price support.

#### Income subsidies per animal: effects on non-member countries

It is doubtful whether non-member countries would enjoy better trade outlets with income support per animal than with price support. Certainly the EC's feedstuff requirement would grow if the number of animals rose substantially, but this requirement would consist primarily of feed for maintenance (mainly domestic forage) rather than, as with price support, feed for production (mainly imported concentrates). At most, non-member countries could profit indirectly from the changeover to income support from price support through the EC's increased import requirement for vegetable products caused by the growth in the cultivation of forage crops at the expense of other arable crops.

## 2.4. Direct income payments to farmers

### General

It has been suggested in various quarters, including the Atlantic Institute (1970), Van Riemsdijk (1972, 1973) and more recently Koester and Tangermann (1977) and Heidhues and others (1978), that income transfers to the farming sector should not be tied in with the volume of production or productive factor inputs. The EC market would then continue to stand open to the world market (apart from stabilisation of short-term fluctuations) while farmers whose incomes were below a certain level would receive a direct income supplement from public funds.

To a greater extent even than land-related income subsidies, direct income payments to farmers, would provide greater scope, depending on the form they took and their attendant conditions, for trying to achieve the specific income objectives and other (agricultural) policy aims. Firstly, income support can be aimed directly at the farmers who need it most. One might envisage raising incomes to a level comparable with the minimum wage in the particular Member State or region. Secondly, the subsidy could be made for a limited period only. Van Riemsdijk suggests that only the present generation of farmers should be eligible for the subsidy and that the "hobby-farmer" should be excluded. The subsidy would be terminated when the farmer reached 65, while young farmers would only be given the subsidy for a maximum period of 20

years. Besides serving as an instrument of income policy, the direct income payment could therefore also help to work towards certain structural policy aims. Thirdly, just like subsidies per hectare, direct income payments also allow scope for manipulating production choices by means of the criteria governing the subsidy's allocation.

#### Effects on production and consumption

Direct income supplementation does not affect the levels of producer and consumer prices. If these subsidies were to replace the present price support, prices in the EC would consequently fall to world market levels. As was also the case with hectare subsidies, this alternative policy would not have the same effect of stimulating production, via the increase in marginal revenue, as that theoretically achieved by price support.

Apart from the marginal revenue effect, the volume of production would also be influenced, especially in the longer term, by the income effect. A higher income would encourage labour to stay in agriculture while, partly in line with the labour input and partly because of the improved capital situation, there would also be a higher input of capital goods. This income effect occurs with all forms of income support and would be on the same scale with this alternative policy of direct income supplementation, provided that the distribution of income within agriculture remained the same, as it would be with the present price policy.

If, however, as one might expect, the allocation of the subsidies is more dependent on social considerations, there could be differences from the present policy as regards the impact of income support on the input of productive factors and consequently on the volume of production. Here, there are two lines of argument that could apply, with one leading to the conclusion that the income effect on production is greater with direct income payments than with the present price policy, while the other arrives at the opposite conclusion and argues that it would in fact have less of an effect on the volume of production.

According to the first argument, the fact that the marginal producers in particular would see an income improvement would lend paramount importance to the following effects:

1. farmers who have a low income under the present price policy because production is on a small scale and therefore leave the sector would not do so with the system of direct income supplementation because of the improvement in agricultural incomes. The volume of other inputs would increase along with the growth in the labour input and this would eventually generate expansion of the total volume of agricultural production;
2. farmers who remain in the sector under the present price policy as well but lack the capital for investment would be able to invest if they received direct income payments and thus to expand production;

3. price support provides greater security with regard to the money revenue per unit of output. However, there is always a risk of poor harvests so that there is therefore still an element of uncertainty as to the total income level. Direct income payments would in fact eliminate this lack of security so far as this total income level is concerned and this feeling of greater security would be sufficient in itself to warrant an increased input of productive factors and thus generate a greater volume of production.

According to the second line of argument, the following effects would be paramount:

1. farmers who do not seek to maximise their income but prefer to strike a balance between their level of income and the amount of leisure time available could be tempted by income subsidies to reduce their productive activities in order to achieve the same income level but with less effort than is required under the present price policy;
2. if income subsidies were provided, marginal farms (with an average low level of efficiency) which would otherwise go out of business would continue in operation. This would stop the larger farms from expanding and prevent them extending their high productivity rate per hectare to the land of those who "stay put". Aggregate agricultural production would thus be lower than it is under the present price policy.

It is difficult to judge which of the two arguments would be the most valid. A switch from the present price policy to direct income supplementation would probably have side-effects that would both increase and decrease production. Whatever the case may be, income subsidies are bound to have some effect on the overall volume of production. We shall suppose for the moment that the volume of production will be greater with this alternative policy than it would be for a policy without any form of support and that, due mainly to the lower marginal revenue, it would be smaller than under the present price policy or a deficiency payments system.

#### Social costs and income distribution

The social costs of direct income payments are lower than for deficiency payments or the present price policy because there are no distortions in the prices of agricultural products on either the supply side or the demand side. In this instance the social costs consist entirely of the difference between the revenue from the additional input of resources in the agricultural products supported and the loss of revenue sustained by those who would have deployed those resources elsewhere in the agricultural sector or outside it (plus the costs of additional public expenditure).

It is difficult to judge whether the social costs of direct income supplementation are higher or lower than the costs of land-related subsidies. Generally speaking labour would be the first factor of production to be affected by direct income payments while with hectare subsidies land would be the first to feel the impact. This could therefore lead one to suppose that the first form of income support would mainly result in labour being misallocated between agriculture and the other sectors, while hectare subsidies would tend to cause misallocation of land within agriculture itself. The misallocation of labour would be negligible if the support was granted to types of labour for which there would be relatively little demand outside agriculture, while the misallocation of land would also be only slight if hectare subsidies were given a general application. The extent to which the social cost differs from one alternative to the other appears ultimately to depend on how the support is distributed within the sector.

As already mentioned, direct income supplementation does not influence consumer prices. It is comparable in this respect, and so far as the burden on the Exchequer is concerned, with the other forms of price and income subsidies. In addition income transfers are likely to be less substantial under a policy which aims at obtaining a minimum guaranteed agricultural income than they would be under, say, a deficiency payments system.

#### Effects on non-member countries

Owing to the increased demand and reduced volume of production the import requirement would be greater with direct income supplementation than it is with the present system and it would not be necessary to employ variable levies other than for short-term price stabilisation. There would, however, be fewer trade outlets for non-member countries than if there were no support at all because of the effect the subsidies would have on production.

#### Regional distribution of production and income in the EC

The way the burden of a system of direct income supplementation would be shared out among the EC Member States is similar to that found with deficiency payments. The major burden would no longer be borne by the countries with the highest per capita consumption but by those with the highest per capita national income.

The distribution of the benefits would depend very much on the variant that was selected. An income subsidy system that sought to give all EC farmers the same minimum income guarantee would mean that the distribution of benefits among EC farmers (and hence among the Member States themselves) would be quite different from the present policy. If, however, a more appropriate regional approach was adopted, which sought to achieve a minimum agricultural income that corresponded to comparable incomes in the same region outside the agricultural sector, there would be less of a change

from the present so far as the distribution of benefits is concerned.

A subsidy system whose objective is a socially acceptable minimum income is likely to have an effect on the regional distribution of production in the EC. Marginal producers and production areas would be better off than producers in areas with better conditions for production.

#### Administrative problems

In conclusion it must be pointed out that the introduction of a direct income supplementation system in the EC is likely to be accompanied by almost insurmountable administrative problems. Any income subsidies that are designed to attain a socially acceptable minimum income would have to be based on farm accounts. 1) Most of the EC farms, however, do not keep accounts, which is precisely why VAT in the Community is collected by a flat-rate system and also why various countries employ a simplified system of income tax collection. Consequently it would seem to be quite impossible to administer a system whereby, for reasons of structural policy, the granting of income subsidies would depend on compliance with strict criteria.

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1) It should also be mentioned that there is such a wide divergence of thought in the EC as to what should constitute a socially acceptable minimum income that this is also likely to prove an administrative problem.

### 3. Alternative forms of income policy with direct supply control: quota arrangements

#### 3.1 Introduction

##### Market equilibrium and self-sufficiency

Promotion of equilibrium in supply and demand on the EC markets does not necessarily imply that complete self-sufficiency must be aimed for. Surpluses can still occur with a lower degree of self-sufficiency if the international distribution of labour makes it desirable to import products from non-member countries rather than producing them oneself. There may also be a wish to reserve a share of the internal market for external producers for reasons of trade policy or as a measure for co-operating with developing countries. On the other hand a degree of self-sufficiency greater than 100% does not necessarily imply that there will be surpluses since it is quite possible that the Community offers comparative cost benefits for some agricultural products with respect to non-member countries.

Since the inception of the common agricultural policy the EC's degree of self-sufficiency in farm products has increased. In section 2.1 we saw that at least part of this growth can be attributed to the operation of this policy. There is no reason to suppose that relative production costs inside and outside the EC have altered much in favour of the Community. Consequently neither the Community nor the non-member countries have been able to benefit from the potential advantage of better international distribution of employment while the developing countries in particular have been given fewer opportunities to place their competing farm products on the EC market. For supported products with a degree of self-sufficiency greater than 100% (e.g. dairy products) the growth in production has led to a steep increase in the budget expenditure on export refunds and, lastly, the negative influence of EC policy on the world markets, which will be discussed in Chapter 4, has been strengthened and with it the need to store produce at great expense.

##### The alternatives examined

Chapter 2 showed that one of the ways in which other forms of income support differ from the present price policy is that they result in a lower volume of production and/or an increase in demand. The introduction of alternative forms of income support should therefore be able to contribute to greater market equilibrium.

This chapter is concerned with price support variations for limited production quotas. The quota arrangements are designed to

have a direct impact on the volume of supply. The variations under discussion are price guarantees for an EC-wide production quota (also called a mixed price system), an arrangement of price guarantees for quotas awarded to individual farm firms and finally a system of deficiency payments for quotas also awarded per farm firm.

Policy measures which directly affect the input of resources can also assist in the supply management of agricultural products and one such measure might be the retirement of agricultural land. For the most part, however, measures of this kind tend to form part of structural policy and therefore are in fact outside the scope of the present report, dealing as it does with price and income policy. Apart from the observations made in the course of the discussion on land-related income payments (in section 2.3), no other consideration will be given to this type of measure.

Nor is this report concerned with the alternative of simply reducing the price of farm products substantially right across the board. This kind of reduction, which has been suggested, *inter alia*, by Heidhues and others (1978) 1) and which is in real terms partly taking place at the moment whenever there is a slight nominal price increase, would have such consequences for agricultural incomes as to render it socially and politically unacceptable unless linked to other policy measures.

#### The existing quota arrangement for sugar

At the moment the EC has a guaranteed market price for a limited quota of sugar production, which is shared out between the different Member States. The countries can decide for themselves whether they award quotas to individual sugar beet producers or whether it should apply to the national output as a whole. In the first instance each producer receives a guaranteed price for the amount of sugar supplied within the quota (which is further divided into A and B quotas) and must market the rest (the "C-quota") himself. In the second instance the quantity produced nationally above the (A+B) quota must be sold at the world market price and the individual farmer receives a "mixed" price for the quantity he has produced which is equal to the sum of the guaranteed price  $\times$  guaranteed quota plus world market price  $\times$  the rest of the quantity produced divided by the total quantity produced. The Netherlands was one of the countries that applied the mixed price system until 1977. Because, as we shall see later, a mixed price leads to an output per farm that is higher than the quota, the B quota is halved for countries with a mixed price.

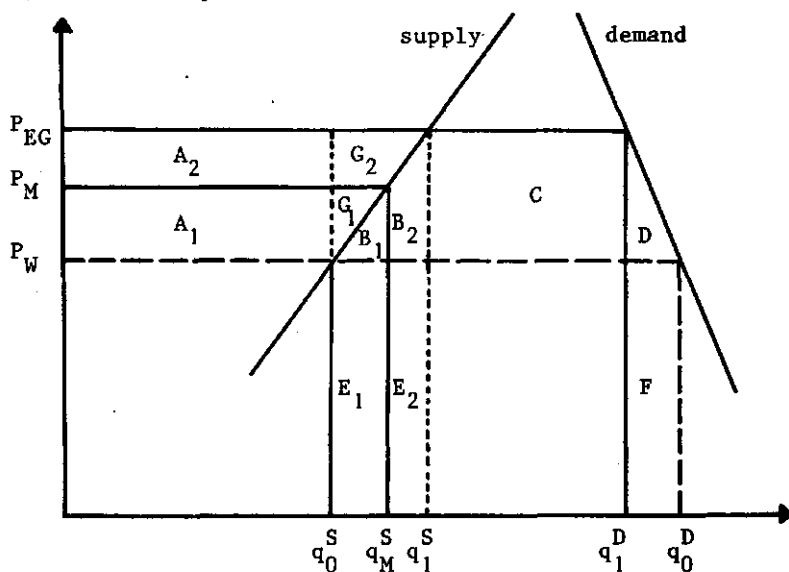
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1) The authors of that publication calculate that a drop in price of at least 10% in agricultural units of account will be necessary if the termination of the present MCA system is not to generate an increase in the degree of self-sufficiency.

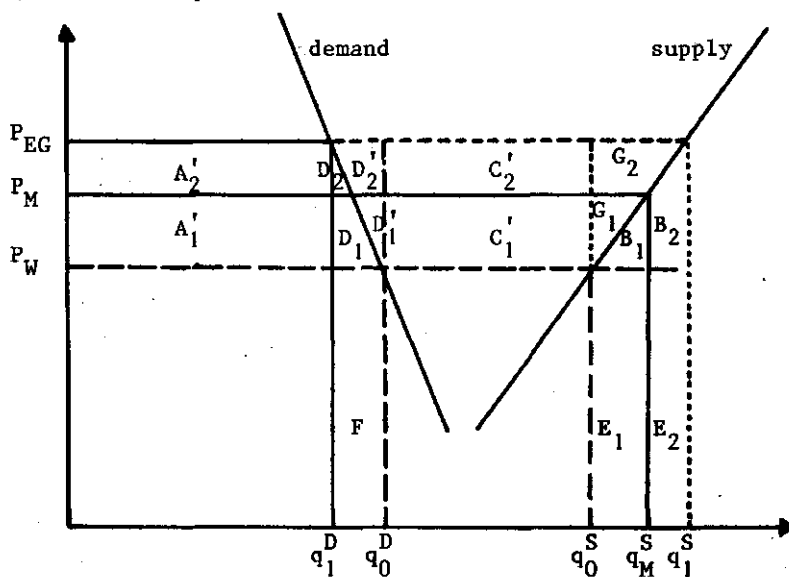


Figure 3. Effects of a mixed price system

a) with net import



b) with net export



### 3.2 Restriction of the price guarantee to an EC-wide production quota: mixed price and co-reponsibility levy

The level of the mixed price

Let us assume that the price guarantee applies to the quantity of the quota product produced in the Community at world market prices. We shall also assume that the level of the price guarantee is the same as the price level under the present price policy. In figure 3  $q_0^S$  is the production quota,  $P_{EG}$  is the price guarantee and  $P_W$  the world market price. The final mixed price in this situation is  $P_M$ . At this price  $q_M^S$  is produced.

$$\text{For } P_M \text{ the equation is: } P_M = \frac{q_0^S \times P_{EG} + (q_M^S - q_0^S) \times P_W}{q_M^S}$$

In this equation  $q_0^S$ ,  $P_{EG}$  and  $P_W$  are known.  $P_M$  and  $q_M^S$  are also related by the long-term elasticity of supply, so that the levels of  $P_M$  and  $q_M^S$  can be calculated, given this elasticity.

Effects on production, consumption and income distribution with an unchanged price guarantee level

As in sections 2.1 and 2.2, the lettered triangular and rectangular areas can be taken to represent the consequences of this form of price guarantee in terms of production, consumption, budget expenditure, income distribution, national income and balance of payments, as well as the policy's social effects. A number of them are the same as, or analogous to, the effects of the present price policy discussed in section 2.1, so that they can be summed up quite briefly. For every unit of output the producers obtain the same price  $P_M$ , which is higher than the world market price  $P_W$  and lower than the market price  $P_{EG}$ . As a result output increases in comparison with the situation where there is no price support from  $q_0^S$  to  $q_M^S$ . This generates an increase in income amounting to  $A_1 + G_1$  in the net import situation and to  $A'_1 + D'_1 + D_1 + C'_1 + G_1$  in the net export situation. There is an additional input of resources of  $E_1 + B_1$  for the increase in production. In comparison with the present policy there is a fall in output of  $q_1^S - q_M^S$  leading to a fall in income of  $A_2 + G_2$  in the net import situation and  $A'_2 + D'_2 + D_2 + C'_2 + G_2$  in the net export situation.

For the consumers there is a price level of  $P_{EG}$  with a mixed price system. For them the effects are the same as under the present price policy, i.e. an increase in expenditure of  $A_1 + A_2 + B_1 + B_2 + G_1 + G_2 + C - F$  in the net import situation and of  $A'_1 + A'_2 - F$  in the net export situation plus a loss of utility in both situations of  $D + F$  (in which  $D = D_1 + D_2$ ).

The budget income is  $G+B+C$  for net imports and the budget expenditure is  $D+D'+C'$  for net exports. There is therefore an increase in income or fall in expenditure, as the case may be, to the value of  $G+B$  in comparison with the present price policy.

#### Social costs

Disregarding the relatively low social effects of the change in budget income or expenditure, the aggregate result or social effect of this redistribution of income is  $G_1 - A_2 - D$  in the net import situation and  $G_1 - A'_2 - D'_2 - D - D_2 - C'_2$  in the net export situation. It can be proved 1) that  $A_2 = G_1 + B_1$  and that  $A'_2 + D'_2 + D'_2 + C'_2 = G_1 + B_1$ , so that compared with the situation in which no form of price support is given, the social effect of the alternative policy is  $-(D+B_1)$  in both the net import and the net export situation, provided that there is full employment. In times of unemployment, the maximum effect is  $-(D+B_1) + E_1$ .

The national income effect under full employment is now  $-B_1$  minus part of  $D$  and under unemployment the maximum effect is  $+F-B_1$  minus part of  $D$ . Consequently the social disbenefit and the negative national income effect are both less than under the present price policy.

Effects on non-member countries; regional distribution of production and income in the EC

The same applies for the balance of payments effect: the foreign exchange savings on agricultural products amount to  $E_1 + F$ , the minimum total exchange saving is  $+F-B_1$  and the maximum saving is  $+F+E_1$ . Under this alternative policy the EC market therefore offers non-member countries more sales opportunities than the present policy but fewer than if there were no price support at all. The degree of self-sufficiency does increase but less than with the present policy.

So far as the effects of the mixed pricing system on the regional distribution of production and income in the EC are concerned, these will not differ in their nature from those of the

#### 1) Proof for the net import situation:

It follows from the definition of  $P_M$  that:

$$P_M \times q_M^S = P_{EG} \times q_0^S + P_W \times (q_M^S - q_0^S)$$

Therefore:

$$(P_W \times q_0^S + A_1 + G_1 + B_1 + E_1) = (P_W \times q_0^S + A_1 + A_2) + E_1$$

$$\text{so that: } G_1 + B_1 = A_2$$

present policy but will be somewhat less pronounced.

The situation changes if the quota is not for the EC as a whole but is awarded to the individual Member States. In that situation it would be quite conceivable that the regional distribution of production would be determined by the quota rather by comparative cost benefits. This would lead to disparities in mixed price levels which would tend to cancel out the differences in comparative costs, thus diminishing the incentives for attaining optimum regional specialisation. This could largely be avoided if the annual quota allocated to each member state was adjusted to take into account the exceeding of quotas in previous years.

Effects with income compensation by means of raising the price guarantee

Given our previous assumptions, under a mixed price policy with the price level remaining the same, the agricultural income derived from the supported product is lower by  $A_2 + G_2 (= G + B_1)$  than under the present price policy. This income difference could be eliminated by raising the guaranteed price from  $P_{EG}$  to  $P'_{EG}$ . It can be proved that the price increase required for this in figure 3 is equal to  $G+B$  divided by  $q_0^S$ . One then gets a mixed price  $P'_M$  which is equal to the present guaranteed price  $P_{EG}$  and a volume of production  $q_M^{S'}$  equal to the present volume  $q_1^S$ .

The resultant situation is exactly the same for the producers as it is under the present price policy. The volume of production and income both remain the same. There are differences, however, for the budget and consumers. The higher price  $P'_{EG}$  ultimately leads to an (additional) transfer of income from consumers to the budget and to a fall in consumption of the product in question, so that the problem of surpluses that may already exist is aggravated by the drop in consumption. The social costs of the policy are higher than under the present price policy because the decline in consumption of surpluses following the price rise from  $P_{EG}$  to  $P'_{EG}$  is greater than the increase in revenue (or fall in expenditure as the case may be) accruing to the government budget.

Comparable effects of mixed price system and co-responsibility levy

The co-responsibility levy on milk introduced in 1977, although by no means a quota arrangement, does have a number of consequences which are comparable with the effects of the aforementioned variation of the mixed price system. The way in which the levy is operated - a price increase (say from  $P_{EG}$  to  $P'_{EG}$ ) which is partly clawed back by a percentage levy - does in fact effect a shift of budget expenditure on to the consumers without

affecting the producers in any way. 1) Without co-responsibility levies, the same sales policy would have to be followed as is now being aimed at. If, for example, dairy products from the co-responsibility levy were sold off at a lower temporary price (on the lines, say, of another Christmas butter scheme), the difference in price is then more likely to be financed from the budget as compared with the present situation where it are the consumers themselves who fund this difference in price.

### Conclusion

The conclusion arrived at is that a mixed price or co-responsibility levy whose application is such as to ensure that producers receive the same income from the supported product as they do under the present price policy would entail more social costs than under the present policy, would not help to solve the problem of surpluses, would, in fact, intensify this problem by causing greater price distortion on the demand side, and would ultimately serve to reduce the burden on the budget. For non-member countries it would have the effect of curtailing their trade outlets in the EC as a result of greater tariff protection. The only effective way of attaining the desired objective would be to have a mixed price system which, for the producers, might well end up in a drop in price and income. In that case the mixed price would result in the burden being transferred from the budget to the producers and the social costs would be lower than under the present policy. A mixed price system is therefore not capable of helping to secure the income objective and the desired market equilibrium both at the same time. 2)

### 3.3 Restriction of the price guarantee to a production quota allocated on a farm firm basis

#### Comparison with the mixed price system

With a price guarantee for a production quota allocated to individual farms, for the producer the revenue per unit of output up to the quota is equal to the guaranteed price  $P_{EG}$  and is lower for the succeeding units of output, say  $P_W$ . The marginal revenue

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- 1) Whether the net price increase was enough to enable the producers to offset the increase in production costs of milk is beside the point.
  - 2) The same is true of Marsh's suggested variation (Marsh 1977) on the mixed price system which set a limit to budget expenditure on market intervention and export subsidies.

for the individual producers is therefore not constant, as it was with a mixed price system, but falls sharply at the point where the volume of production exceeds the quota.

Effects on production and income with the guaranteed price level and equal individual elasticities of supply for all farms

Figure 4. Effects of a price guarantee with production quotas per farm

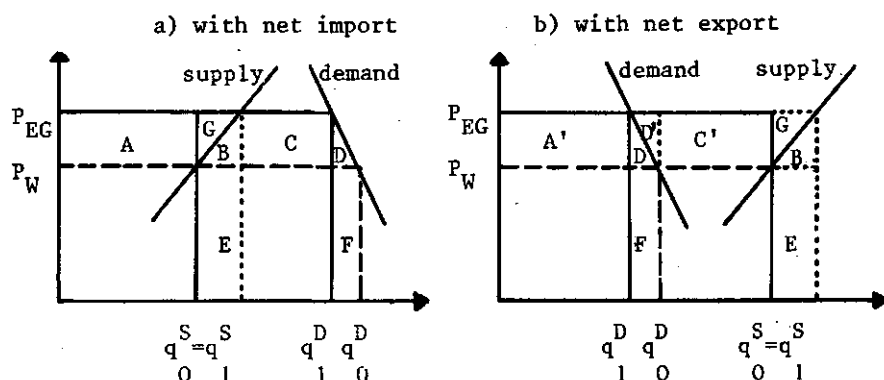


Figure 4 still assumes that the price elasticity for each individual producer's supply is the same as it is for all the other producers. It is also assumed that the sum of the production quotas allocated to each farm is equal to the production quota taken in the previous section, i.e.  $q_0^S$ . Therefore, till  $q_0^S$  the marginal revenue is  $P_{EG}$  and beyond  $q_0^S$  it is  $P_W$ . In this hypothetical situation there is no point in the individual farmer producing more than  $q_0^S$  because beyond that point his marginal costs become greater than the marginal revenue.

Given these assumptions, under a system of farm quotas the total volume of production is  $q_0^S$  and consumption  $q_1^D$ . In this case the level of production corresponds to the level obtained when there is no form of price support, while the guaranteed price level is the same as for the present price policy or the mixed price system. The price guarantee does not result in price distortions in the supply of farm products.

For the producers the consequent income level in the net import situation is greater by A than would have been the case without price support. With net export this difference in income is  $A' + D' + D + C'$ . It can be proved that in this situation, with the same guaranteed price, income is lower by G in both the net import

and net export situation than it is under the present price policy without individual quota arrangements, but higher by  $B_1$  than with a mixed price system (for triangle  $B_1$ : see figure 3).

The volume of production when the price guarantee level remains the same and individual elasticities of supply differ

Individual elasticities of supply do in fact differ and may be greater than for supply as a whole for some producers and less for others. The aggregate price elasticity of supply met with on the market is the weighted average of the individual elasticities.

In comparative graphs like figure 4 one should find that the supply curve for the price-inelastic suppliers is steeper than the curve for total supply given in the graph, while the supply curve for the price-elastic suppliers is flatter. If every producer is allocated production quotas of the same size (i.e.  $\frac{S_0}{q_1}$  times the original volume of production) for the price-in-elastic producers the vertical  $q_0^S$  then intersects the supply curve at a point below  $P_W$ , while for the price-elastic producers the relevant intersection comes at a point above  $P_W$ . The result is that with the fixed quota the inelastic producers are faced with marginal costs that are lower than the marginal revenue  $P_W$  beyond this point and are therefore tempted to exceed the quota. Any further reduction of the quota that may occur does not lead to an additional cut in production. For the elastic producers the marginal revenue derived from exceeding the quota is less than the marginal costs and does not make it worthwhile exceeding the quota. For them any further reduction of the guaranteed quota is likely to cause an extra curb on production because with the new quota the price  $P_W$  is lower than the marginal costs shown by the supply curve.

We therefore find that although a farm quota system embracing all the producers ought to result in production being limited to the amount of the quota, a lesser diminution of production does in fact take place, and the reason for this is to be found in the disparities in individual elasticities of supply. If quotas are not to be exceeded, they will either have to be related to the price-elasticity of supply of the producer with the highest price-elasticity or, instead of being shared out impartially, they will have to be allocated to individual producers and related to that producer's own price-elasticity of supply.

Both measures would result in exactly the same situation for the quota-determined supply for the sector as a whole as that shown in figure 4. However, neither of them would work in practice. What might well work is a system of differentiated quotas for groups of producers, where the size of the quota allocated to each group would have to be related to the average supply elasti-

city of that particular group. In that case the quotas would not be exceeded as much by the whole body of producers as it would be if quotas were undifferentiated.

Comparison of the volume of production with that obtained under a mixed price system

Indeed the quota allocation can be more effective, even in the most unfavourable situation of undifferentiated quotas, than it is with a mixed price system. This shows up quite clearly if the entire loss of income arising from quota allocation is completely offset by an increase in the price of the quantities produced within the quota. In such a case, as we saw in section 3.2, the production effect with a mixed price system is nil. With farm quotas the marginal revenue for quantities produced above the quota would still be  $P_W$  for both the price-elastic and price-inelastic producers, and the same volume of production would be obtained as with a quota arrangement without an income-compensatory price increase. With low elasticity of supply this volume of production is already smaller than under the present price policy.

It is more difficult to prove that, if there was no income-compensatory price rise, a system of undifferentiated farm quotas would still be a more effective instrument for controlling supply than a mixed price system. Obviously, it would have more effect on producers, who, because of their marginal cost curve, produce more than their allotted quota. The marginal revenue from the units produced above the quota is greater with a mixed price system than with the farm quotas. One cannot say definitely how the producers with greater price elasticity who keep to their quota would react, because if the quota is exceeded marginal costs would be greater than revenue price. If the marginal costs for these producers' allocated volume of production are below the mixed price they would then also produce less with farm quotas than with a mixed price system. If, however, with that volume of production their marginal costs are above the mixed price, then a mixed price system is a more effective instrument for controlling supply so far as these producers are concerned. To a large extent the producers' collective supply is ultimately determined by the size of the quota. If the size of the quota is much less than the volume of production that would have been selected with a fixed price guarantee and without a quota system, then the mixed price is not as high as price  $P_W$  and a mixed price system therefore gives a low level of output. Elastic suppliers can then, with a farm quota system, have a quota allocated to them that is greater than their volume of production under a mixed price system. In practice, given also the average elasticity of supply of agricultural products, quota allocation will come quite close to the volume of production obtained without such a quota system. The mixed price is then not as low as the present price  $P_{EG}$  so that



the volume of production will not be much different from that obtained without a quota system. In these circumstances, a quota system on a farm basis soon becomes a more effective instrument for managing the production of price-elastic products as well.

It seems therefore that we can also assume, even if we drop the principle of compensating for the loss of income, that in practice for all producers as a whole a system of farm quotas is a more effective instrument for managing the volume of production in European agriculture than a mixed price system.

Agricultural income and income distribution with disparate individual price elasticities of supply

If price-inelastic farms exceed their quota and price-elastic farms meet their quota in full the total quota amount for the sector as a whole will exceed the quota amount. The total quantity produced is therefore also greater when there are different individual elasticities of supply, at say  $q_1^S$  as compared with the quantity  $q_0^S$  given in figure 4. The increased production ( $q_1^S - q_0^S$ ) is accompanied by additional revenue and costs. The additional revenue is represented in figure 4 by part of area E, let us call it  $E_1$  and the additional costs by part of ( $E+B$ ), say  $(E_1+B_1)$ . The resulting income effect from exceeding the quota is  $E_1 - (E_1+B_1) = -B_1$ . This income effect augments the much greater effect G referred to earlier, so that the total income effect if a quota system is introduced when there are disparate individual price-elasticities of supply is equal to  $-(G+B_1)$ .

The loss of income  $B_1$  is comparable to the loss  $B_1$  with a mixed price system discussed in figure 3.  $B_1$  is related to  $B_1$  as the squares of the amounts by which the quota is exceeded in both systems. Since as a rule quotas are exceeded less with a farm quota system than with a mixed price system  $B_1$  is also smaller than  $B_1$ .

The fact that the exceeding of quotas leads to additional loss of income for all the producers as a whole when it was concluded earlier that individual producers do not expand their production beyond the point where marginal costs exceed marginal revenue appears to be a contradiction. The reason for this apparent contradiction is that producers with a price-elastic supply receive price support for a part of the units of output that are produced at costs higher than  $P_W$ , while producers with a price-inelastic supply do not receive price support for any part of their output although they produce every unit at a lower cost than  $P_W$ .

Because of differences in the marginal cost curves, the income loss ( $G+B_1$ ) derived from the introduction of a quota system would not be evenly distributed among all the producers. Price-inelastic producers have less reaction to the fall in marginal revenue than price-elastic producers and are able therefore to offset a smaller proportion of the total fall in revenue with a fall in costs resulting from a drop in output. This means that their income is subject to greater pressure than that of price-elastic producers and that a mixed price system suits them better than an undifferentiated farm quota system.

Undifferentiated quota arrangements therefore result in income being redistributed between price-elastic and price-inelastic producers. This occurs much less with differentiated quota systems and do not occur at all in theory when farm quotas are wholly related to the elasticity of supply for a particular farm.

#### Effects on consumers and the budget

So far as consumers are concerned it makes no difference whether with a price level of  $P_{EG}$  the system applied is that of the present price policy, farm quotas or mixed prices, regardless of whether elasticities of supply vary from one farm to another. The total loss of benefit as regards the situation where there is no increase in the market price continues to be  $A+G+B+C+D$  with net import  $A'+D$  with net export.

Assuming that world market prices are independent, the situation for the budget is wholly comparable with a mixed price system. In comparison with the present price policy, there are savings of  $G+B$ .

#### Social costs

With equal individual elasticities of supply or perfectly allocated differential quotas the sum of the income redistribution effects between producers, consumers and budget is equal to  $-D$ . Disregarding the relatively low social costs of altered budget expenditure, this figure stands for the social costs of this alternative policy. These social costs stem from the losses of benefit incurred as a result of price distortions on the consumer side and are partially reflected in the national income.

With disparate individual elasticities of supply the sum of the income effects and thence also of the social costs is not  $-D$  but  $-(D+B_1)$ . Social costs as a result of price distortions are then incurred on both the demand side and the supply side. However these costs are still lower than the costs  $-(D+B_1)$  with a mixed price system or  $-(D+B)$  under the present price policy.

## Effects on non-member countries

Non-member countries' access to the EC markets is impeded just as much by import levies as it is with the present price policy or a mixed price system, but their trade outlets are expanded by an equal amount because production is managed more effectively. In comparison with the situation when there is no form of price support internal demand is reduced ( $q_1^D - q_0^D$ ) as is the growth of output ( $q_1^S - q_0^S$ ).

## Effects with income compensation achieved by raising the price guarantee

Obviously the income loss  $G$  and  $(G+B_1)$  respectively incurred when producers change over from the present price policy to a price guarantee for individual quotas can be bridged by an increase in the price guarantee. In this case it would be necessary to have a price increase  $P''_{EG} - P_{EG}$  equal to the difference in income  $G$  and  $(G+B_1)$  respectively divided by the quota  $q_0^S$ . This price increase with a linear supply relationship in the relevant area and an income loss  $G$ , is only half the price increase  $P'_{EG} - P_{EG}$  discussed in the previous section. Also with an income loss  $G+B_1$  one finds that  $P''_{EG} - P_{EG}$  is still substantially less than  $P'_{EG} - P_{EG}$  under a mixed price system.

The reason that price increase ( $P'_{EG} - P_{EG}$ ) is almost twice as great as the increase ( $P''_{EG} - P_{EG}$ ) is that in the first case a loss of income  $G+B$  has to be made up for eventually and in the second case this is only  $G$  and  $G+B_1$  respectively, plus the fact that with linear supply relationships  $G$  is equal to  $B$ .

With a mixed price system the price rise leads to growth of production because the marginal revenue  $P_M$  increases. We have already looked at this in section 3.2. There the conclusion was reached that the income-compensatory price increase cancelled out the effect of the quota arrangement. The volume of production ends up at the original level  $q_1^S$  found with the present price policy.

With a farm quota arrangement the price increase for units produced within the quota does not lead to a change in the price level  $P_W$  for those units that fall outside the quota. In that case there is no reason at all for the production quota to be exceeded by more than the amount discussed earlier ( $q_1^S - q_0^S$ ). Thus the income compensatory price increase does not reduce the effectiveness of the quota arrangement. One must then also conclude that a system of quotas allocated on a farm basis is capable of both achieving the income objective and controlling production.

A side-effect of the price increase from  $P_{EG}$  to  $P'_{EG}$  and  $P''_{EG}$  respectively is that demand for the product wanes and this results in additional social costs and failure to achieve the desired market equilibrium objective. Because of the lower price level  $P''_{EG}$  this drop in demand is less with farm quotas than with a mixed price system.

The income compensatory price increase, which offsets the income loss  $(G+B_1)$  with farm quotas, leads to overcompensation of the loss of income with regard to farms with elasticity of supply and to undercompensation for farms where supply is inelastic. For compensation is only given in relation to the units of output that come within the quota, and the price-inelastic suppliers have suffered a greater loss of income in relation to their volume of production than the price-elastic suppliers.

#### Implementation

The main objection to a farm quota arrangement is said to be the problems it presents as regards administration and management. The EC has already had some experience of this with the arrangement for sugar. The arrangement is that a full price guarantee is given for the so-called A quota, there is a limited price guarantee for the B quota and the C quota must be sold at world market prices.

In order to ensure that sugar beet producers receive a lower price if they exceed the quota there is a levy on output in excess of the guaranteed A quota. There is a penalty attached to the C quota which is designed to induce the producer to sell the sugar on the world market without export refunds. The central authority funds the costs of selling the surplus production from the revenue from the levy. The levy makes it possible to limit administration to checks on the amounts delivered to the sugar factories by the individual producers.

A similar system for, say, milk would only require extra administration of the allocation to the separate suppliers of milk deliveries for processing in addition to the existing controls for operating the co-responsibility levy. One complication with milk (which can be drunk without processing) is the potential farm gate sales of surplus production. With a farm quota regulation such potential sales are rendered all the more attractive by the fact that the price advantage attainable is much greater than it is with a mixed price system. Apart from the additional cost of checks on farmgate sales one must also bear in mind the fact that the dairy industry is spread over a much greater number of units than the sugar industry, and this in itself means that much more extensive 'policing' is required.

One of the major problems with sugar is the difficulty of finding a basis for apportioning the quotas. Sugar production can vary considerably, because on the one hand the annual yield is affected by the different weather conditions from year to year, while on the other hand it is quite easy when planning arable farming to substitute other crops for sugarbeet. In these circumstances the choice of the criteria for determining the size of each farm quota can present considerable difficulties.

One side-effect of a certain set of allocation criteria may be that the producer plays safe and makes sure that he can be certain of meeting his quota. Favourable weather conditions are then almost sure to mean that the quota will be exceeded.

With a product like milk where the producers can turn to fewer substitutes and the yield per cow is less dependent on the weather, the annual fluctuations in the volume of production are relatively less. What is more, the producer is better able to adjust the volume of production in the short term to suit his requirements by, say, regulating the amount of concentrates fed to the animals. Here too there will be fewer problems surrounding the choice of the basis for allocating the quotas than there are with sugar, and there is also less chance of quotas being exceeded.

The introduction of a quota system actually entails an administrative system partly replacing the market mechanism as the output-distribution mechanism. This creates scope for the distribution of production to be steered along different lines from those it follows at present, and the choice of the basis for the allocation of farm quotas and the determination of the size of the quota are elements in this process. Thus it is possible by varying the basis of allocation and the size of the quota to influence the way in which production is distributed among the EC Member States. The present debate on possibly introducing milk quotas is certainly considering relating the quotas to the present volume of production but is also looking at comparative cost advantages, growth potentials and the possible originators of the present surpluses.

If factors other than just the current volume of production are taken into account the quota arrangement could be more effective, the social costs could go down and the loss of income could be shared out more uniformly among all the producers, as we saw earlier in this section when discussing differentiation of quotas according to groups of farms with disparate price elasticities of supply.

However there is also the possibility that improper elements in the distribution of the quotas can have the effect of reducing its effectiveness and actually increasing social costs. An allocation on the basis of Member States is such an improper element simply because there are large and small Member States. The separate regions in the large Member States are able to relocate their production with one another internally, which is a possibi-

lity denied the smaller Member States. One example would be a comparison between the Netherlands and Brittany. Both specialise in animal products and are undergoing considerable expansion of production. A quota per Member State would set a limit on Dutch output while allowing Breton output to continue to grow as a result of greater regional specialisation in France. It would be more convenient in this instance, irrespective of other drawbacks, for quotas to be allocated on a regional rather than a national basis.

In all cases the volume of production in the past will constitute an important basis for the quota allocation. However, if decisions taken in the light of recent statistics continue to be applied well into the future there is a risk that the quota arrangement could render the agricultural structure and regional distribution of production in the EC much more inflexible. This risk is most pronounced if quotas are permanently allocated on a farm and/or Member State basis although producers who produce very cheaply would still be able to profit from producing more than the fixed production quota. 1)

So far as social costs are concerned, this inflexibility would be very detrimental, especially in the longer term. If the quotas were to be allocated annually and/or made saleable the chances of inflexibility would be considerably reduced, especially if annual allocation was based on total deliveries in previous years and not just on deliveries within the previous quota.

If quotas were made saleable their price would depend, inter alia, on the difference between the guaranteed price and the world market price, as well as on the period covered by the arrangement. The price would also be substantially affected by the relative cost benefit derived from producing in large units. In this respect there is a certain similarity between the price of production quotas and the price of land. One would therefore also expect the introduction of saleable production quotas to depress land prices because quotas would join land in becoming a very scarce "factor of production". This may result, especially in the land-related crop production sectors, in income being redistributed from land-owners to quota-holders. Producers who wish subsequently to enter that sector of production will be faced with the extra expense of purchasing licenses to supply, but will have to spend less on buying land.

The OECD (1973) points out that eventually the cost of buying the licences would have to be included in the production costs. If the guaranteed price-level is based on the level of costs then

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1) A ban on supplying more than the permitted quota would simply lead to greater inflexibility.

prices will go up. This could trigger off a cost-price spiral which, in addition to having income redistribution effects in agriculture, would also affect consumption of the product subject to the quota. Any price increase causes consumption to fall and eventually the effect of the reduction of production on market equilibrium would be curtailed by a drop in the demand. In the longer term, therefore, a system of saleable quotas would be a less effective instrument for restoring market equilibrium.

One final aspect of a quota arrangement (mentioned by Kriel-laars, 1965, amongst others) is the effect this would have on sectors of production not subject to quotas. In arable farming where there are greater opportunities for substitution this would be a short-term effect. In dairy farming there are often few alternative uses to which the resources can be put in the short term, but in the longer term substitutions could also be made in this sector with, say, intensive livestock farming or beef production.

It may be desirable from the point of view of social costs for shifts in production of this kind to take place since this would keep at bay the effects of the price distortions found with the present policy. One would also need to prevent production surpluses being transferred to other supported products. If this should happen the effectiveness of the quota arrangement would be somewhat limited in consequence.

## Conclusion

The foregoing seems to indicate that a farm quota price guarantee, unlike a mixed price system, is capable of helping to bring about, especially in the short term, both the income objective and the market equilibrium aimed at. With equal income transfers to agriculture the social costs are lower, despite a higher price for consumers, than those of the present price policy. The reason for this is that there would be fewer shifts of production as a result of price distortions on the supply side.

The quota arrangement therefore has several attractive economic effects, although these would be partly negated if it was applied in such a way as to cause inflexibility in the Community's farming structure and regional distribution of production.

Indeed one is led to believe that differential allocation of quotas is by no means out of the question. The opposite is in fact true and so far as economic effects are concerned differentiation on a regional basis or according to groups of farms would be a very attractive proposition if it were based on the different price elasticities of supply.

So far as implementation is concerned, the problems involved differ from product to product. If one wished to consider introducing quotas because of their appeal on economic grounds these problems of implementation are the main area in which further study of specific products is called for.

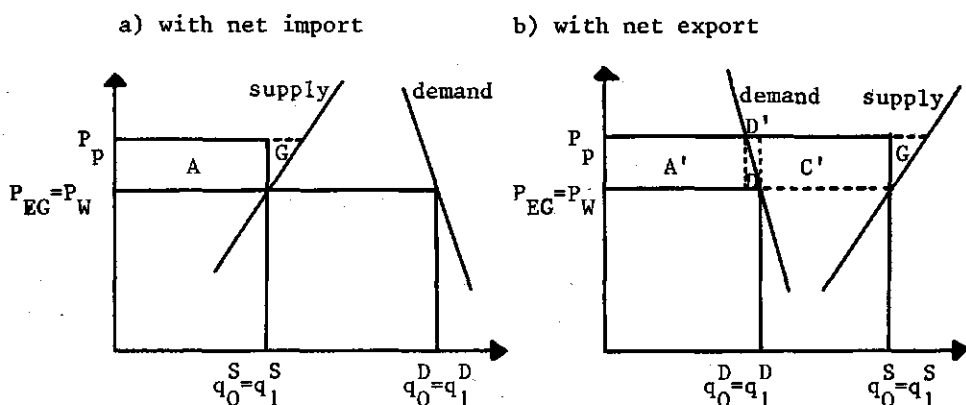
### 3.4 Deficiency payments for quotas allocated on a farm firm basis

Marsh and Ritson (1971) suggest a system of awarding deficiency payments for production quotas allocated to individual farms. In this alternative the advantages of the price guarantee for individual quotas discussed in the previous section are combined with those of deficiency payments.

Effects on production, consumption and income distribution

Figure 5 shows the supply and demand graphs, with equal elasticities of supply for all producers, for a product that is eligible for a deficiency payment. The quantities demanded and supplied in this case are both where they would be without price support: there are no price increases and price distortions on the demand side; on the supply side price increases do not lead to an increase in marginal revenue and thence to greater production, at least not for the average producer.

Figure 5. Effects of deficiency payments with farm production quotas



In this situation this alternative policy has no effects for internal consumers or for the trade outlets of non-member countries compared with the situation where there is no form of price support. Income is only redistributed from the budget to the producers. This income redistribution is A in the situation of net import and  $A' + D + D' + C'$  in the situation of net export. It would be possible to achieve the same income as under the present price policy if additional income transfers were made to the value of G. In order to achieve this it would be necessary to increase the deficiency payment  $P_P' - P_P$  which is equal to the price increase



$P''_{EG} - P_{EG}$  discussed in the previous section.

If the assumption of equal individual price elasticities of supply for all farmers is discarded the conclusions are slightly different. As with the form of production quotas discussed in the previous section price-inelastic suppliers also exceed their allotted quota when receiving deficiency payments for farm quotas. The amount by which all the producers put together exceed the quota is  $(q^S_1 - q^S_Q)$  in this case as well. The loss of agricultural

income from introduction of the quotas is then not  $G$  but  $(G+B_1)$ . Compensation for this loss of income necessitates an additional increase in the budget subsidy  $(P''_P - P_P)$ , which brings the total deficiency payment up to  $(P''_P - P_W)$ . However budget expenditure will still be  $(B-B_1)$  less than for a deficiency payments system without quotas.

#### Social costs

Apart from the costs incurred in the redistribution of income from the budget to agriculture, deficiency payments with farm quotas only result in social costs that stem from disparities between price-elastic and price-inelastic suppliers. These costs total  $B_1$  and are greater with undifferentiated quotas than with differentiated quotas.

There are no social costs on the demand side because there is no change in relative prices. The total social costs are therefore  $(B+D-B_1)$  less than with the present price policy,  $(B-B_1)$  less than with deficiency payments without quotas, lower by more than  $(B+D-B_1)$  than with a mixed price system and lower by more than  $D$  than with the quota arrangement with an income-compensatory price increase discussed in the previous section.

#### Implementation and variants

The technical and administrative problems presented by deficiency payments for farm production quotas should theoretically be the same as those for price guarantees for the same quotas. One difference in administration is that it would not be necessary to collect any levies or penalties for units produced above the quota, but there would be price supplementation to make under the quota. The unit price for the product is equal to  $P_W$ . The complication with, say, milk of farmgate sales of quantities produced above the quota by-passing the normal sales channels would not arise because in this case there is no financial advantage in doing so.

The risk of causing inflexibility of the production structure can also be reduced with this system if there is annual allocation

based on the total volume of production and/or the quotas are made saleable.

Marsh and Ritson also put forward as a variant on their proposal the idea of varying the deficiency payments according to the farm or type of farm. In this way greater stress would be laid upon the social aspect of the income support. The individual quota arrangement would then more or less become a form of direct income subsidy with conditions attached to it that were designed to ensure there was no change in the volume of production.

In section 3.3 we looked at income redistribution effects as between separate producers stemming from the introduction of a quota arrangement. Producers with a price-elastic supply would be overcompensated, producers with an inelastic supply would be undercompensated. Variable deficiency payments could serve to eliminate this over- and under-compensation, although implementation of such a system is likely to go hand in hand with the inevitable administrative problems.

#### Conclusion

The conclusion for this section is that a deficiency payments system for production quotas allocated on a farm basis is very attractive so far as promoting market equilibrium is concerned, would entail relatively low social costs, would enable agricultural incomes to be maintained without escalating consumer prices and would barely impinge upon the trade outlets of non-member countries. However the alternative policy does place a heavy burden on the central budget.

So far as administrative implementation is concerned, the same problems occur as with a price guarantee for farm quotas. The only advantage that deficiency payments for quota amounts enjoy in this respect is that with milk, for instance, it is not possible to bypass the quota by selling outside the normal market channels. For the market price for all units of output is equal to  $P_w$ .

#### 4. The influence of the common agricultural policy on the world market prices of agricultural produce

##### 4.1 The policy's influence on the level of world market prices

What has been said so far has been based on the assumption that the relevant world market prices of agricultural produce are unrelated to what happens in the Community. In actual fact this is unlikely to be a valid assumption since the EC is responsible for a relatively substantial proportion of the world trade in these products, taking as it does 25% of the world value of imports and providing 8% of world exports. This would lead one to expect that any change in the balance of agricultural imports and exports (including animal feedstuffs) will influence the level of world market prices. In this section we are examining the effects of the present price policy on this area. We are not allowing for any costs of transportation between the EC and non-member countries.

Figure 6. The effects of the present price policy with the EC having an effect on world market prices

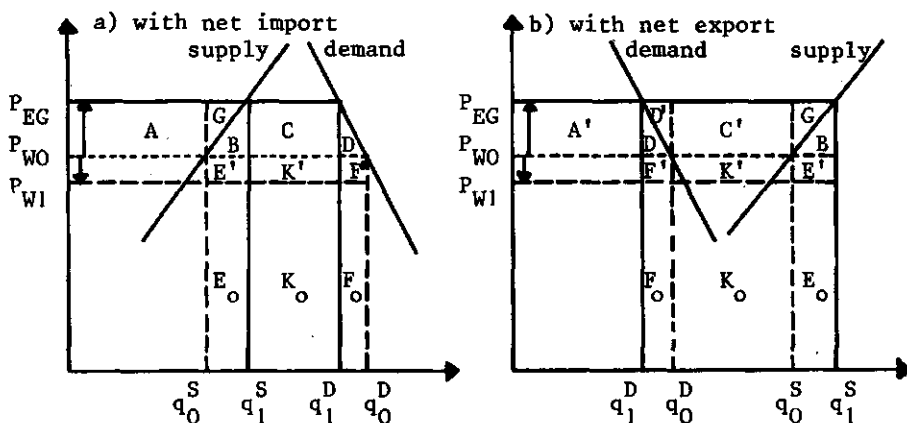


Figure 6 is another version of Figure 1 and shows the effects of the present price policy on demand and supply. As a result of the price in the EC going up from  $P_{WO}$  to  $P_{EG}$  Community imports fall by  $(q_1^S - q_0^S) + (q_0^D - q_1^D)$  in the net import situation and exports increase by the same amount in the net export situation. These changes in

turn cause world market prices to slump from  $P_{W0}$  to  $P_{W1}$  with the amount of this fall in prices depending on the price-elasticities of supply and demand on the world markets.

Besides affecting producers and consumers in non-member countries, this fall in price also affects the EC. In the original situation the import value for products with a degree of self-sufficiency of less than 100% was  $E_0 + E' + K_0 + K' + F_0 + F'$ . If there were no fall in world market prices this sum would be  $K_0 + K'$  following on the increase in EC prices. The fall in world market prices means that the value of imports drops to  $K_0$ . The central budget benefits from additional import levies to the value of  $K'$ , which means that the present policy engenders not only C but  $C + K'$ . For producers the situation is not different from that described in section 2.1; consumers pay less to non-member countries and more to the central budget. The result is a social benefit for the EC of  $K'$  which wholly or partly offsets the social disbenefits of this policy and may even overcompensate for them. 1)

With a degree of self-sufficiency greater than 100% the value of exports was originally  $K_0 + K'$ . If there were no fall in world market prices this would climb to  $K_0 + K' + F_0 + F' + E_0 + E'$  following on the increase in EC prices. However the fall in world market prices eventually results in the export figure becoming only  $K_0 + F_0 + E_0$ . Although producers receive additional export subsidies to compensate for the imbalance  $K' + F' + E'$  this is also accompanied by an additional burden on the budget and extra social costs of matching proportions.

This leads one to conclude that with a degree of self-sufficiency of less than 100%, the fall in world market prices brought about by the present price policy causes the burden on the budget and the social costs to be less than they were found to be in section 2.1, but with a degree of self-sufficiency greater than 100% these are both greater. The same conclusion can also be drawn for any other alternative incomes policy which effects changes in the EC's imports and exports of agricultural products. With price guarantees for a fixed quota it will be the producers rather than the budget who bear part of the burden arising from the fall in

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1) Given the price elasticities of demand and supply on the world markets and the revenue from alternative employment of resources allocated in Community agriculture, it is theoretically possible to determine what the optimum degree of self-sufficiency would be so far as social costs are concerned.

foreign exchange revenue. 1)

#### 4.2 The connection between dependent world market prices and the holding of intervention stocks in the EC

World market prices that are not dependent on Community policy should mean that every unit of output can be bought or sold on the world market at the same price. The level selected for a price within the Community then predetermines the amount of the refund per unit of output exported.

If however we must assume that the world market price does substantially depend on Community supply and demand, the expenditure on export refunds will climb by more than a proportionate amount if exports increase. Mounting exports lead to a fall in the world market price which means that with every succeeding unit of output exported it becomes necessary to increase the refund on all the preceding units. A point will be reached where it becomes more advantageous from the point of view of exchange revenue and budget spending to stop exporting the product altogether. One is then faced with the alternatives of storing stocks (in the hope that the market will improve), of subsidising certain forms of consumption, or even, as a last resort, of destroying produce. Therefore as regards the holding of intervention stocks for other purposes than their acting as buffers against short-term fluctuations in supply or as part of an international stock-holding policy, this is a matter of obtaining optimum exchange revenue and budget expenditure in the EC and is directly related to the dependence of world market prices on supply and demand in the Community. Consequently intervention is primarily designed to serve the Community's own interests by keeping down the costs of the policy. Such international considerations as prevention of dumping and fear of repercussions can cause the decision to switch to holding intervention stocks to be taken earlier than is rational from the point of view of minimising costs.

The conclusion arrived at is that with dependent world market prices the holding of intervention stocks can help to reduce the agricultural policy's budget expenditure and social costs, provided, of course, that there is a prospect of profitably disposing of them in the future. If there is not, then the costs of holding stocks (interest charges, storage costs etc.) are an unnecessary

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- 1) Tables A and B in Annex 3 show, for two imaginary products, the differences in, inter alia, social costs for the various alternatives as between situations with independent and dependent world market prices. With a degree of self-sufficiency greater than 100% and dependent world market prices these costs appear to be rather high.

additional burden on the central budget and result in additional social costs. It would then be more advantageous from the social point of view to destroy the surpluses.

#### 4.3 The sale of surplus stocks with dependent world market prices

In addition to advertising and other general sales procedures, the EC has on numerous occasions resorted to subsidies on consumption in order to get rid of production surpluses. This has mainly taken the form of subsidising the sale, outside the normal trading channels, of stocks that cannot be sold off commercially. Provided that the market for the subsidised product is capable of effective demarcation, it has been possible to recover part of the production costs. This amount would otherwise have been lost altogether if the product had been destroyed or have had added to it the further cost of permanent storage.

This section is looking at what welfare gains can be derived from the subsidised sale of surplus stocks. Depending on the type of product, there are three categories of users that qualify for consideration as recipients of stocks cleared by this subsidisation of consumption: internal consumers, internal users of animal feedstuffs and external buyers. Agricultural subsidies that are designed directly to restrict the supply of products by encouraging the farmer to produce his own animal feed perform the same function in this context as consumption subsidies on animal feedstuffs.

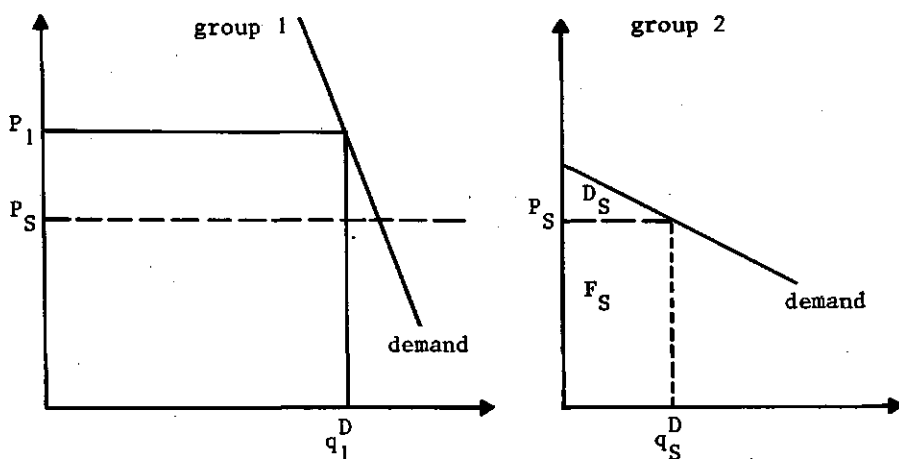
The subsidies can either apply to all the consumers of agricultural produce or they can be for the benefit of special groups. In the case of the former internal consumers would actually experience a reduction in the market price, with the subsidy constituting the difference between the market price and the producer price. The resultant situation would be similar to that found with the system of deficiency payments per unit of output described in section 2.2.

If the subsidies are for special groups, these would only be for the benefit of those consumers singled out by reason of their relatively elastic demand but who at the present EC price level are hardly, if at all, in the market. That being the case it would then be possible to split up the market effectively according to the different types of demand. If it were otherwise, subsidised sales of surplus stocks would give rise to the creation of new surpluses elsewhere and it might be better to undertake a straightforward price reduction instead.

In figure 7 the internal consumers are divided up into two groups. With the present price level  $P_1$  only consumer group 1 is

in the market and the quantity demanded by this group is  $q_1^D$ . A subsidy  $P_1 - P_S$  also generates demand ( $q_S^D$ ) from another group of consumers, 2. Consumers therefore experience an increase in utility of  $D_S + F_S$ , which is set against a growth in expenditure  $F_S$ . The central authority can sell the quantity  $q_S^D$  from its surplus stocks for the price  $P_S$  and sees its income rise in net terms by  $F_S$ . There is no change for the producers. The outcome of this sale as opposed to destruction of surplus stocks is a social gain  $D_S + F_S - F_S = D_S$  on behalf of the consumers and  $F_S$  for the budget, the total result therefore being  $D_S + F_S$ .

Figure 7. The effect of a consumer subsidy for specific groups of consumers



The net benefit  $D_S$  represents a net utility benefit for consumers and an income benefit for other users. For consumers who are also producers of farm products, as would be the case with animal feedstuffs, this income growth can lead to expansion of production, as was outlined in chapter 2. The consequent withdrawal of resources from alternative uses can engender social costs. In this situation the ultimate social effect is less than  $D_S + F_S$ .

Subsidies on the consumption of farm products by external consumers amount to additional export refunds on exports. Assuming that these subsidies are only given on exports to countries not normally traded with, these additional exports will generate additional foreign exchange. Given that the elasticity of demand

on these foreign markets is the same as that assumed in figure 7 for consumer group 2, with an additional export refund  $P_1 - P_S$  the quantity sold is  $q_S^D$  and the exchange revenue is  $F_S$ . This exchange revenue is equal to the welfare gain of the alternative policy and is expressed in the balance of payments of the EC.

It is primarily the price elasticity of the demand which determines whether more is to be gained by selling surplus stocks within the Community rather than on the external market. Maximum revenue is obtained on the market with the maximum price elasticity (the market with the flattest demand curve in figure 7). If the price elasticity is the same for sales inside and outside the EC it is then theoretically more advantageous to make the sale within the Community because this generates not only revenue  $F_S$  but also additional utility  $D_S$ .

One again it must be said that all this depends on whether effective market separation is possible.

#### 4.4 The influence of price stabilisation in the EC on the scale of price fluctuations on the world markets

Both the EC and non-member countries experience short-term fluctuations of production due mainly to weather conditions. Unless the authorities or other agencies intervene these fluctuations will generate price swings that are undesirable for a variety of reasons.

The levies and refunds on external trading under the present common agricultural policy serve to stabilise the EC prices at different levels from those found outside the Community but they also help to achieve price stability on the internal markets, and are made variable for that purpose. The assumption was made in the previous chapters that the variable section of the levies and refunds would be retained in all the alternative policies with a view to preventing price fluctuations within the EC. In this section we shall be examining the effects of this mechanism on world market prices.

The damming of the estuaries in the south-west of the Netherlands as part of the Delta Plan has reduced the water-holding capacity of the southern sector of the North Sea. Consequently the highwater mark reached on the dikes of Zeeland, where the waters are still open, is significantly higher than it was, especially when there are very high tides. The same thing occurs when certain (sectional) markets are closed off from the world markets by "damming" because the variable levies and refunds come to act as sluices and pumps. The dampening down of price fluctuations within the EC has led to an increase in fluctuations



outside the Community. The world market can no longer benefit from the absorptive capacity of EC consumers.

The fluctuations in the "open waters" are further aggravated by the fact that internal fluctuations in supply do not affect the internal "water level" but are released into the "open waters" outside. The fluctuations in internal and external production are therefore (virtually) exclusively absorbed by external consumers. The outcome of all this is that there are fluctuations in world market prices which are much greater than they would be if there were no price stabilisation in the EC.

It is theoretically possible for the Community to follow a price stabilisation policy that would not have a harmful effect on external price fluctuations. For this to happen the Community would somehow have to absorb within itself not only fluctuations in its own output but also the share of external production fluctuations that its own consumers would have to take up if there were no stabilisation. In practical terms this means that the Community would have to follow an active stockholding policy. There are elements of the present intervention policy which hint at a move in that direction.

One must bear in mind, however, that it would only be within the Community that a stockholding policy of this kind would offset the detrimental external effects of internal price stabilisation. Such a policy would certainly not help the EC to make a positive contribution towards stabilising world market prices. For that to happen the Community market would need to absorb a much greater share of the fluctuations in production that take place outside the EC.

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Annex 1. The effects of various forms of price support and income support in agriculture

Effect on	Alternative policies	Present price policy	Deficiency payments for land-related animal products	Land-related income for subsidies for land-related animal products	Income subsidies per animal	Direct income payments to farmers
<b>Specific variables:</b>						
<b>Internal supply of agricultural products:</b>						
- supported vegetable products	+	+	+	+		+
- other vegetable products	-	-	-	-	-	
- land-related animal products	-	+	+	+	+	+
- other animal products	-	-	0	0	0	0
<b>Internal demand for agricultural products:</b>						
<b>Animal feedstuffs</b>						
- supported vegetable products	-	-	0	0		
- supported animal products	+	+	+	+	+	+
- other products	+	+	+	+	+	+
- others	-	-	0	0	+	+
- supported vegetable products	-	-	0	0		
- supported animal products	+	+	0	0	0	+
- other products	+	+	0	0	0	0
<b>Trade outlets for non-member countries:</b>						
- accessibility	-	-	0	0	0	0
- animal feedstuffs sales	-	-	-	-	-	-
- supported products	-	-	-	-	-	-
- other products	+	+	+	+	+	+
- other sales	-	-	-	-	-	-
- supported products	-	-	-	-	-	-
- other products	+	+	0	0	0	0
<b>Price level of agricultural products:</b>						
- producer prices	+	+	+	+	+	+
- supported products	+	+	+	+	+	+
- other products	+	+	+	+	+	+
- consumer prices	+	+	+	+	+	+
- supported products	+	+	+	+	+	+
- other products	+	+	+	+	+	+
- total animal feed prices	+	+	+	+	+	+
- price level of agricultural land	+	+	+	+	+	+
<b>Agricultural income level:</b>						
- vegetable production sectors	+	+	+	+	+	+
- land-related animal production sectors	-	+	+	+	+	+
- other production sectors	-	-	0	0	0	0
<b>Consumer expenditure:</b>						
- supported vegetable products	+	+	0	0		0
- other vegetable products	+	+	+	+	+	+
- supported animal products	-	+	0	0	0	0
- other animal products	-	+	0	0	0	0
<b>Budget revenue less budget expenditure: a)</b>						
- with net import into EC	+	+	-	-	-	-
- with net export from EC	-	-	-	-	-	-

Annex 1 (cont'd)

Effect on	Alternative policies					Deficiency payments for land-related vegetable products	Land-related income for subsidies for vegetable products	Income subsidies per animal	Direct income payments to farmers
	Present price policy for vegetable products	for land-related animal products	for land-related vegetable products	for land-related animal products	for land-related vegetable products				
Global variables:									
EC degree of self-sufficiency in agric. prod.	+	+	+	+	+	+	+	+	+
Gross national product: a)									
- in times of full employment	-	-	-	-	-	-	-	-	-
- in times of unemployment	-	-	-	-	-	-	-	-	-
Consumer's surplus	-	-	-	-	-	-	-	-	-
Social benefit or burden: a)									
- in times of full employment	-	-	-	-	-	-	-	-	-
- in times of unemployment	-	-	-	-	-	-	-	-	-
Others:									
Administrative/technical implementation	-	-	-	-	-	-	-	-	-
Scope for specific measures concerning the structure of production, or the distribution of income	0	0	0	0	0	0	0	0	0
a) with independent world market prices									

## Notes (annex 1)

This annex compares the alternative forms of price and income support and the effects thereof that were discussed in chapter 2. A distinction is made between vegetable products and land-related animal products so far as their support under the different policies is concerned. With regard to production effects it is assumed that support is not given to animal products that are not land-related. In assessing the alternatives by their effects the comparison is always with the situation in which there is no form of price or income support. A plus sign indicates an increase in the variable in question under the alternative policy while a minus sign denotes a decrease. A zero means that the variable in question is only very slightly modified, if at all. If there is no sign at all this indicates that the effect in question does not apply.

The number of plus and minus signs in the horizontal comparison of the alternative policies indicates the relative magnitude of the effects. It should be noted that this comparison is only possible to the extent that the alternative policies are applied within the two distinct product groupings (vegetable and land-related animal products). It is not possible in this table to compare vegetable products with animal products under the same alternative policy.

Notes (annex 2)

The assumption is made in all the graphs that the world market price ( $P_W$ ) of the supported product is not affected by the EC policy. It is also assumed that income support in agriculture remains the same in every alternative (with net import  $A+G$  and with net export  $A'+D'+C'+G$  when  $G=A_2-B=A_4$  and  $G=A'_2+D'_1+D'_2+C'_2-B=A'_4+D'_3+D'_4+C'_4$  respectively and  $A'+D=A'_1+D'_1=A'_3+D'_3$ ).

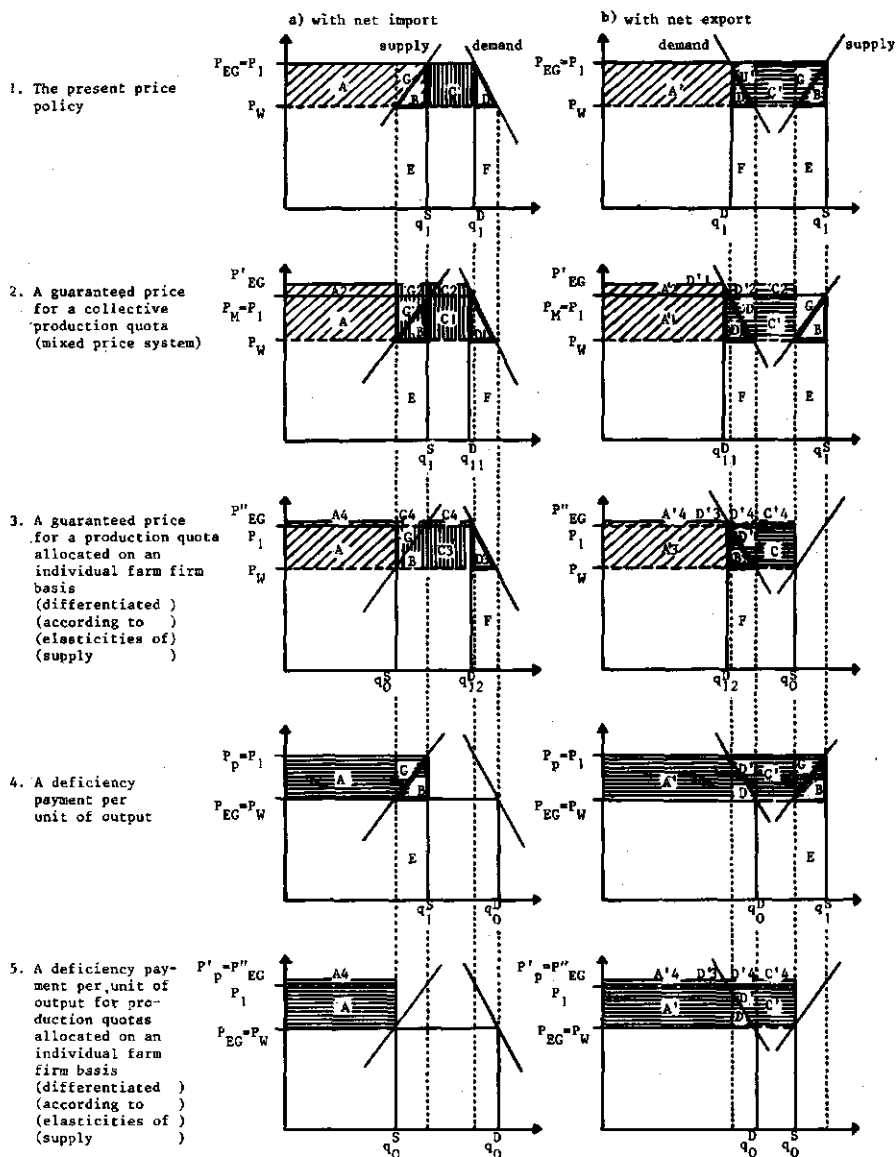
The present EC price level is taken to be  $P_1$ , and the market prices (=consumer prices) are taken to be  $P_{EG}$ ,  $P'_{EG}$  and  $P''_{EG}$  respectively. The quantity supplied at the present price level is  $q_1^S$ ; the quantity demanded  $q_1^D$  now. If supply is subject to quotas the amount of the quota is  $q_0^S$ . The producer revenue per unit of output is  $P_{EG}$ ,  $P_M$ ,  $P''_{EG}$ ,  $P_P$  and  $P'_P$  respectively.

The graphs show that the alternative policies can be placed in the following order of preference.

Given the same level of income support for the producers and a preference for (a):	the order of preference is as follows:														
	present price policy			mixed price system			production quotas per farm			deficiency payment			deficiency payment with production quotas per farm		
low level of production	3	4	5	3	4	5	1	2	3	4	5		1	2	
high level of demand			3			5		4		1	2		1	2	
absence of import levies and export refunds	3	4	5	3	4	5	3	4	5		1	2		1	2
trade outlets for non-member countries			4			5		2 x)			3 x)				1
low consumer price			3			5		4		1	2		1	2	
high producer price	3	4	5	3	4	5	1	2	3	4	5		1	2	
low consumer expenditure			3			5		4		1	2		1	2	
low budget expenditure/high budget revenue			3			1		2			5				4
low social costs			4			5		2 x)			3 x)				1

x) The order of preference applies to when the price elasticity of supply is greater than the price elasticity of demand. It will be different for a relatively greater elasticity of demand.

Annex 2. A comparison in graph form of the effects of various forms of price support when world market prices are independent of EC policy



Annex 3. Numerical magnitude of effects of alternative forms of price support for two imaginary products with world market prices that are independent of and dependent on EC policy respectively

These tables assess the volume, price and value effects of alternative price policies for two hypothetical products. It is assumed that the total agricultural income support per unit of output remains the same. It is also assumed that any production quotas are fixed at the level of production that would be achieved without price support. The long-term price elasticity of demand in the EC is -0.2 for both products, the price elasticity of supply is 0.7 and both are calculated on the basis of the level of prices and volume obtaining under the present policy. Finally, it is assumed that the income for producers is equal to 67% of the level of revenue under the present price policy.

There are two sets of calculations for each product and each alternative policy so that one can clearly see the differences between the two situations when world market prices are independent of and dependent on EC policy. The EC's share of imports and exports is assumed to be the 25% of world trade that it is with the present price policy.

For the product in Table A it is assumed that EC production under the present policy is 8.5 million tons and consumption is 9.5 million tons. The Community price is 320 UA per ton and the world market price is 290 UA per ton in the absence of distortion by the EC. In the case of world market prices being dependent on the EC there is, at this price, a price elasticity on the world markets of -0.5, given an international volume of trade amounting to 4 million tons.

For the product chosen in Table B the EC output, under the present price policy, is 105 million tons and consumption is 75 million tons. The Community price is 150 UA per ton. At this price and volume level the world market price without EC distortion is 125 UA per ton, world trade is 120 million tons and price elasticity is -0.2.

In both tables the sum of the additional potential uses by producers, budget and consumers plus the increase in expenditure on raw materials is taken to be equal to the balance of trade for agricultural products. This balance minus the purchase of agricultural raw materials and plus the welfare gain for consumers gives the social effect of the alternative policy.

Table A. Numerical magnitude of effects for a product for which the EC is in a net import situation

Level without price support	Changes in level with producers' income remaining constant											
	with independent world market prices				with dependent world market prices				with dependent world market prices			
	price				price				price			
	limited production quotas				limited production quotas				limited production quotas			
	present policy	without quota arrangement	for farm quotas	firm quotas	present policy	without quota arrangement	for farm quotas	firm quotas	present policy	without quota arrangement	for farm quotas	firm quotas
1	2	3	4	5	6	7	8	9	10	11	12	
CHANGES IN VOLUME x 1000 tons												
Production	7942	+558		0	+558	0	+558	0	+558	+558	0	0
Internal consumption	9678	-178	-191	-184	0	0	-178	-239	-184	+258	0	0
Net import	1736	-736	-749	-184	-558	0	-736	-797	-184	-300	-558	0
Self-sufficiency (%)	82	89	90	84	88	82	89	90	84	86	88	82
PRICE CHANGES in UA per ton												
Producer price	290	+30	+30	+31	+30	+31	+30	+30	+31	+30	+30	+31
Consumer price	290	+30	+32	+31	0	0	+30	+40	+31	-43	0	0
World market price	290	0	0	0	0	0	-107	-116	-27	-43	-81	0
CHANGES IN VALUE in mln. UA												
Producers' income	1543	+247	+247	+247	+247	+247	+247	+247	+247	+247	+247	+247
Consumer expenditure	2807	+233	+249	+241	0	0	+233	+310	+241	-357	0	0
Budget balance	0	+30	+50	+48	-255	-247	+137	+233	+90	-624	-255	-247
Balance of trade:												
agricultural products	-503	+213	+217	+54	+162	0	+320	+340	+95	+149	+162	0
agricultural raw materials (max.)		-170	-170	0	-170	0	-170	-170	0	-170	-170	0
Change in consumer welfare		-54	-58	-56	0	0	-54	-74	-56	+69	0	0
Social effect, i.e. maximum national income effect (in times of full employment)		-11	-12	-3	-8	0	+96	+95	+39	+48	-8	0

N.B.: The calculations for farm firm quotas relate to quotas entirely differentiated according to individual elasticities of supply.

Columns 2 to 6 are an extrapolation of the situation described in chapter 2 and 3 and annex 2.

Columns 7 to 12 illustrate the situation described in chapter 4 (in sections 4.1 and 4.2) and are the most relevant for the actual situation.

The social effect does not include the effect resulting from changes in net budget revenue.



Table 3. Numerical magnitude of effects for a product for which the EC is in a net export situation

Level	Changes in level with producers' income remaining constant													
	with independent world market prices							with dependent world market prices						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
without price support														
present price policy														
price														
present price guarantees for														
limited production quotas without														
farm firm quota														
system														
mixed price														
with														
sale of														
surplus														
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